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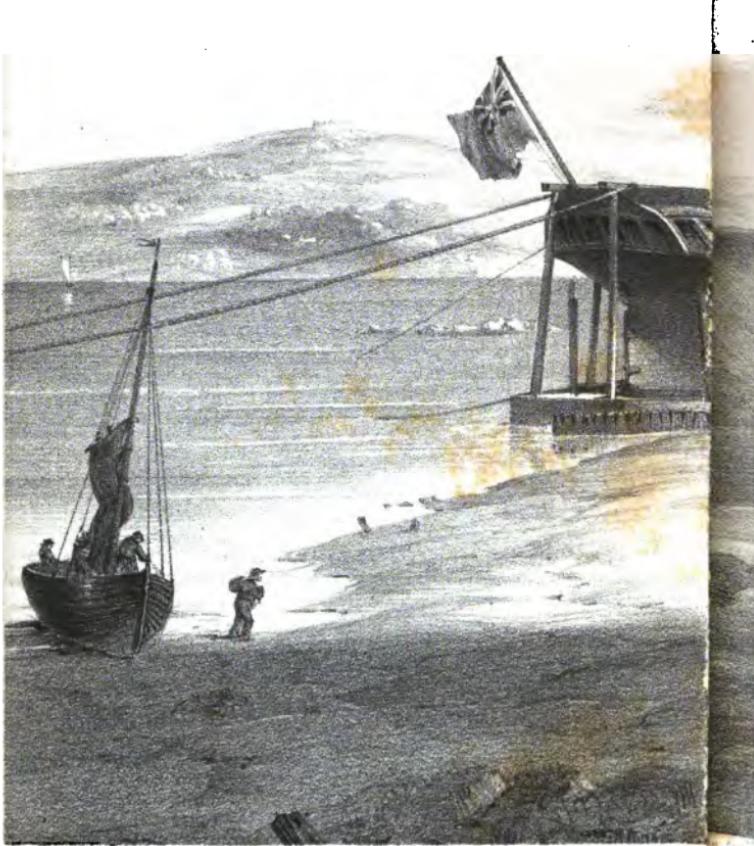












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VM901  
K4

TO THE  
OFFICERS OF THE ROYAL NAVY,  
THIS WORK IS  
Respectfully Dedicated,  
BY THEIR  
OBEDIENT AND HUMBLE SERVANT,  
ASTLEY COOPER KEY.

5/5/03



## P R E F A C E.

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THE following pages are published to the naval world in consequence of the oft-repeated wishes of many British and foreign officers. The subject, though comparatively unimportant in itself, appeared to be viewed with such interest by so large a body of nautical men, that the Author, however diffident of his own powers, has been induced to embody his notes in the form of a detailed and connected Narrative, descriptive of the progress of the operations. He naturally regrets that, for the benefit of the naval service, a more able pen than his own had not been employed; but, in default of that, has endeavoured to lay before the reader, not only an account of the means employed to restore the *Gorgon*, but likewise to point out to the young officer, now rising in his profession, to what advantages the qualities of

perseverance and forethought, with which all are endowed in a greater or less degree, may be applied, if duly cultivated in early life; to show him that even great talents and practical skill, unless combined with those qualities, will not be sufficient to carry him through difficulties which he may expect to encounter during his career in the service.

Some of the reflections and remarks which occur in the course of the Narrative, may appear to savour of vanity; but at the risk of incurring that charge, the writer has considered it to be his duty to define, as clearly as he is able, where credit is due. It would not only be very presumptuous, but insubordinate in a young officer to offer a word, either of censure or praise, on the conduct of his captain: of that the public should be the judges; but still it *is* the duty of an author to place the facts, and, more than that,—the sources of difficulty and motives of action, before them, in such a manner, that they may have fair data from which to draw their conclusions. To nautical men it is needless to mention that, in situations like that of the *Gorgon*, *all* the responsibility, anxiety, and, last, though not least, all the invention and superintendence

of execution, rests with the commanding officer. None can know so well as those who were actually employed in the operations, what amount of mental labour, care, and abilities were required to prove successful in the attempt to rescue the *Gorgon*; and none will be ever so ready, or so sincere in offering their tribute of admiration to the qualities displayed by their captain on that occasion. Surely, then, if the officers of the ship resign all pretensions to claim a share of the credit due to the sagacity, energy, and perseverance which ensured that success which was ultimately attained, some excuse may be allowed to the author for dwelling, at times, in what may appear a self-approving manner, on the originality and ingenuity displayed in many of the plans, and on the firmness and unshaken confidence which enabled skill to overcome renewed difficulties and unexpected failures.

For the reasons before alluded to, the Author has refrained from mentioning any of his superior officers in the course of the Narrative, but he feels it a duty that he owes to the service that the names of Commodore Purvis, Capt. Talbot, and Sir Thomas Pasley,

should always be thought of in connection with the *Gorgon*; they were successively the commanding officers of the British squadron in the River Plate, Commodore Purvis being in command of the station. The promptitude and self-denial with which these officers stripped their ships of any stores that could be of service to the *Gorgon*, the zeal and warmth with which they tendered assistance, and the lively interest they took in the progress of the operations, will never be forgotten by those concerned. May their example prove beneficial to others similarly situated!

If, through the medium of the following pages, any young officer is induced to reflect on the importance of directing all the energy and talent he may possess to the study of that profession which he has entered, thereby to enable him to feel a confidence in his own ability to extricate himself and those under him from any position in which he may be thrown, the object of the writer will have been accomplished.

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A

NARRATIVE,

*&c. &c.*

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IN the month of June, 1843, H. M. S. *Gorgon* arrived in the River Plate, and joined the squadron under Commodore Purvis, then commanding in those waters. Monte Video was at that time invested by sea and land, and a general alarm was prevalent among the foreign population, that the resources of the city were insufficient to withstand the powerful Buenos Ayrean army; and, as the capture of a town by assault has always been accompanied by horror and bloodshed, it is not to be wondered at, that the anticipation of the entry of half savage, undisciplined troops, inflamed moreover, with a national hatred of foreigners, should have wrought on the minds of the British residents a feeling of distrust, and induced them to place their confidence mainly in the guns of their own men-of-war. To protect and give a refuge to them, became, therefore, the more especial duty of

B

our ships, and with this view, anchorage as near the town as safety permitted was selected; the steamers were particularly directed to occupy in-shore berths, the *Gorgon* was therefore anchored in that part of the bay, which had, since the above cause existed, been occupied by vessels of her draught. With the exception of one or two trips, she remained here from June 1843, till May 1844, riding out many heavy southerly gales with the utmost security. This berth is marked on the chart (a). Seamen who are accustomed to navigate the River Plate, will readily apprehend that the *Gorgon* lay at single anchor. No ship of large draught of water ever moors if it can be avoided—amongst many disadvantages may be cited one; owing to the shoalness of the water there is considerable danger, at a low tide, of the keel catching the cable when slackly moored, which actually occurred to, and seriously damaged, a French frigate during the *Gorgon's* stay in the river; and thus taught by experience, the surest guide in all cases, of the numerous men-of-war occupying that anchorage, not one of them (having room to swing) was moored.

The *Gorgon*, then, in the beginning of May 1844, was lying at single anchor at the anchorage above-mentioned, with fifty fathoms on her best bower, the small bower and sheet cables bent, and the anchors clear, 280 tons of coal on board, and the engines in a high state of efficiency: they had

been disconnected, and all the bearings examined in the month of April, and proved to be in perfect order.

On the morning of the 9th May, a breeze set in from the S. W. steadily freshening during the day ; at noon, the barometer stood at 29.7 in., but before dark it had fallen to 29.5 in., thereby indicating an approaching gale. At sunset, after evening quarters, the yards and top-masts were sent on deck, and the best bower cable veered to seventy-five fathoms ; it did not escape the observation of those on board, that the *Gorgon* was the only man-of-war in the bay that had taken this precaution ; at eight an anchor watch was set, Captain Hotham's orders for the night being—"If the wind increases so as to require it, let go the small bower before veering more on the best bower."

Between midnight and daylight on the 10th, the wind had gradually freshened ; the sea having risen considerably, and the squalls becoming more frequent and of greater violence, the boats and guns were re-secured with additional lashings, and all made snug on deck for the approaching gale. At 7.40 A.M. the ship began to drive, the small bower anchor was instantly let go, and the cable veered to thirty fathoms, veering at the same time to ninety-two fathoms on the best bower : the fires were lighted, and the steam got up in all the boilers : the main-trysail was bent and close-reefed ; the ship still driving, the small bower was veered

to forty-two fathoms, and the ship steamed a-head to ease the strain on the cables ; from the peculiar set of the tide, the *Gorgon*, as well as the other vessels in the bay, rode with the wind and sea three points on the port bow ; it is evident that, owing to this important circumstance, the paddle wheels, on which a steamer at anchor usually relies to relieve the strain on her cables, proved of no service to her. The close-reefed main-trysail was then set to assist in bringing her head to the sea, but without effect ; as the ship was still being set in towards a reef of rocks stretching out from the town, it was determined to pick up the small bower, slip the best bower, and steam out to the outer roads, clear of all danger ; the attempt was made ; but such was now the force of the gale that not an inch of the cable could be hove in ; every nipper carried away ; in fact, owing to the direction in which the cable grew, the strain on the hawse pipe was so great, that it was in one send literally shattered in pieces, and the two hawse-holes nearly forced into one. Our cables were now buoyed ready for slipping, if required. At 11 A.M. the ship being then in the position (b), the small bower cable parted before the bitts.

Our course was now clear ; a few minutes more and the ship would be on the rocks astern ; two anchors had failed to hold her, and there was no reason to anticipate that one could do better. The best bower was therefore slipped, and full power

given to the engines. The fury of the gale baffled all our attempts ; truly mortifying was it to observe that, with full steam power, the helm hard a-starboard, and the main-trysail set, she would not come nearer than three points of the wind, and would then pay off. The position of two Brazilian corvettes was also sadly against us ; we were obliged to bear up under their sterns, and were consequently thrown so much farther to leeward : but subsequent observation proved that this, in reality, was of little or no consequence, for it will be seen, by a reference to the chart, that the course we were compelled to steer would not have carried her clear of the *Cerro* by nearly three points. But the ship was now approaching a dangerous vicinity—the western side of the bay. The remainder of the small bower cable was shackled on to the sheet, and at 11.40 A.M. the sheet anchor was let go, veering to seventy-five fathoms on the cable. Our position then is marked on the chart (c).

At noon the gale had risen fearfully, and showed no sign of breaking ; but the anchor was holding well, and the ship riding easy. We were congratulating ourselves on being in an improved position, more sheltered from the sea and the action of the tide than before.

It behoved us, however, to guard against the worst. Not a moment was lost in clearing the stream anchor and backing it with the kedge ; bending thereto the twelve-inch towing-cable ; but

before these anchors could be got ready, to our consternation, the sheet chain parted. A last effort was made to bring the ship's head to wind by steam, but this, as sad experience had led us to anticipate, failed; the vicinity of the land and shoalness of the water soon obliged us to stop the engines. A more disheartening situation could not be conceived. Here was one of H. M.'s finest steamers, with her engines, wheels, and gear in splendid order, perfectly unmanageable—able to steer but one course by the wind, which course would not carry her clear of danger: to wear was impracticable, the attempt would have endangered the merchant ships in the harbour, and a glance of the eye showed that she could not weather the opposite point of the bay. A stern-board in such a gale would have been madness. What, then, remained to be done? excepting the stream and kedge, our anchors and cables were all gone; the guns were slung, and the stream and kedge let go, but as the latter failed to check her for a moment, it was deemed useless to risk the loss of the first; in the mean time, the ship paid round off before the wind, and about 4 P.M. struck abaft,—on this, Captain Hotham gave immediate orders to take in the main trysail, draw the fires, and pump the boilers full, to check her going through the mud. A dreadfully dark night succeeded a disastrous day; the motion indicated that the ship continued to drive through the mud, and as a matter of precaution, the topmasts, fore

and topsail yards, were got over as shores. Still we imagined that the shoalness of the water would soon arrest our progress, and that we should be able at the conclusion of the gale, to drag her afloat without any difficulty. Judge, therefore, of our horror, when daylight broke, and we found the ship broadside on the sandy beach at the top of the tide, with three and a half feet water under the paddle-wheels ; nor was this the worst, the fall of the tide left the *Gorgon* buried thirteen feet in the sand on the starboard side, and nine feet on the port, with the water just washing up to her gangway.

Before proceeding further with the narrative, let us return and endeavour to trace the origin and subsequent causes of such a disaster as I have described, happening to a *steamier*, a vessel of a class hitherto considered to be perfectly free from the usual dangers attending ships riding out a gale.

The *Gorgon* being the only man-of-war in the bay that was driven from her anchors, the first question that naturally suggests itself is,—are her anchors and cables as large, in proportion, as those of other men-of-war ? Let us compare. The *Gorgon* is 1142 tons ; the weight of her bower anchors is 38 cwt. ; her chain cables 1½ inch. The *Vestal* and *Curaçoa* are both under 950 tons ; their bower anchors weigh respectively 38 and 41 cwt. ; and their chain cables are 1¾ inch.

This evident disparity in the size of the *Gorgon's* ground tackle would appear to be of itself sufficient

to account for the untoward event above related; and when combined with the circumstance of her being deprived of the usual resource of a steamer in a similar situation, viz., the use of her paddle-wheels; it may certainly be referred to as the principal cause of the *Gorgon* being driven from her anchors in the first instance.

The next point to consider is,—what prevented the *Gorgon* from steaming out to the outer roads when the best bower was slipped? There are two reasons:—the want of power in the engines, and of sufficient after sail to bring the ship to the wind. The first of these was very apparent to all on board from the moment of slipping the cable: with the full power on, the ship barely gained steerage-way; the rudder, therefore, could be but of little service towards bringing her to the wind. From the position of the mainmast, the effect of the main-trysail, for the same purpose, was but small,—it acted solely as a body sail, and its power was completely counteracted by the action of the wind on the paddle-boxes, which present an equal surface, and are situated nearly as much before the centre of the ship as the close-reefed main trysail is abaft it. This would seem to point out the necessity of a mizen-mast in large steamers.

These two deficiencies, made more apparent by the extreme violence of the squalls and the heavy sea, rendered all attempts to bring the ship head to wind ineffectual. Under these circumstances, what

then was to be done ? the natural idea, perhaps, would be, to cut away the foremast ; but a moment's consideration will point out, that, by so doing, the masts would unavoidably fall foul of the paddle-wheels, and thus render unavailable that power on which we principally relied. The only course open to her was this :—to stand over to a more sheltered part of the bay, and in case it was not possible there to bring her head to wind, to anchor. This course was followed.

We now arrive at the third stage of the catastrophe. The *Gorgon* had parted one cable, and slipped another, but still it would be imagined that she had other anchors and cables, with which to ride out a gale in security : but no ; she had now on board but one sheet-anchor and chain cable, with the remainder of her small bower-chain. No spare anchor ! no hemp cables ! The ship, therefore, was compelled to anchor with the sheet-anchor only, and the result has been related.

The circumstance of a large steamer having been driven from her anchors and stranded, being hitherto unparalleled in the history of steam navigation, will of itself be sufficient excuse for having dwelt so strongly on what appear to have been the causes of the disaster : these causes may be enumerated as follows :—

1st.—The engines not being of power sufficient to meet any *extraordinary* emergency.

2ndly.—The want of anchors and cables in

number and size, proportioned to those of sailing vessels.

3rdly.—The absence of a mizen-mast.

Let me here remark, that in no profession is criticism more active than in the naval service; it is, in fact, its nourishment, though a bitter one; but with naval officers no fixed rules are applicable: a commander cannot say,—by adopting *such* a mode of proceeding, I shall ensure success; every new case calls forth new modes of treatment. Hence, their skill, their capabilities, the performance of their duties, are subject to the most severe and caustic scrutiny, and woe betide the unfortunate commander who, in a trial like ours, should happen to fail, he may be assured that he will meet with no mercy at the hands of his self-constituted judges. But, in addition to this, in our case, national envy had to be encountered; before Monte Video were lying vessels of war of all nations, French, American, Brazilian, &c., all of which rode out the gale in comparative safety. What, then, was more natural, than that they should exult and condemn? but, whichever feeling predominated, from no officer, English or foreign, did we ever hear a word of reproach; nor did any express a hint at neglect or want of skill. On the contrary, from many of the commanders of squadrons and ships of war, Captain Hotham received voluntary testimony to the seaman-like manner in which the ship had been handled, coupled with expressions of regret at her

fate. Perhaps it would be difficult to cite a nautical disaster more exempt from a weak point.

But, to return to the narrative. Daylight on the 11th disclosed to us our truly deplorable situation; in the course of the day, the gale gradually abated, and consequently the water, which had risen in the bay, owing to the violence of the wind, to a greater height than had been witnessed for many years, receded to its usual level, leaving the *Gorgon*, as before mentioned, perfectly dry to within a few feet of her stern post, and imbedded in the sand to the depth of thirteen feet on the starboard, and nine feet on the port side. Here was a situation for an 1100 ton ship! sufficient, one would imagine, to drive the most energetic mind to despair; and with confidence I can assert, that, for the first twenty-four hours, with one exception, no person in the ship entertained an idea of the possibility of ever moving the *Gorgon* from the position she then occupied: that exception was Capt. Hotham, who, after the first survey of her position, arranged his plans, and commenced to put them in operation with a confidence that surprised everybody.

A rapid glance round the bay was sufficient to show that we had not been the only sufferers during the gale; the whole of the men-of-war appeared to have driven considerably; and to the eastward of us, at the head of the harbour, was presented the melancholy spectacle of no less than

nine merchant vessels on shore, most of them complete wrecks.

It will not be out of place here, to give a brief description of the coast and country adjacent to the spot on which we had been cast. On referring to the chart, the *Gorgon's* position will be seen, as denoted by that marked *E*, her head being N. W. by N., lying at an angle therefore of about four points with the line of beach, and rather more than a quarter of a mile from the rocks forming the "Punta de las Piedras." The coast between the rivers Seco and Colorado, was in possession of the invading army, under General Oribe, part of whose territory, therefore, the *Gorgon* occupied: this part of the bay is formed by a level sandy beach, the sand extending about one hundred yards below the low water mark and there meeting the soft mud. The surrounding country is low and unvaried in appearance; the few houses visible are rapidly falling to decay, those near the beach being principally occupied by the soldiers, as guard-houses, &c.

The first low tide showed us the danger we had escaped. Had the ship struck on the rocks (shown in the chart of the bay) lying, as it appeared, directly in our track, she would inevitably have been bilged, and her rescue would have been almost an impossibility; but Providence willed it otherwise; the currents of the bay draw to a focus at the part of the beach we occupied, as our exca-

vations proved that one if not more vessels had been wrecked there before us; and subsequent observations showed us, that boats, lighters, &c., breaking adrift from the shipping or town, invariably washed up at that spot.

To recover our lost anchors became now a matter of great moment, and one which would admit of no delay: so soft is the mud in the River Plate, that an anchor speedily becomes buried by its own weight, and may then be considered lost. This service H. M. S. *Ardent* was ordered to perform; the two bower anchors she succeeded in weighing, but the sheet never could be found. As soon as the weather moderated, offers of assistance from the commanders-in-chief of the foreign squadrons were tendered; they appeared to vie with each other in kindness and good feeling. Captain Vorhers, of the United States frigate *Congress*, especially proved his sincerity, by depriving his large frigate of her hemp cables for our use, leaving her without a sheet cable in the depth of winter. Comment on such an act of fine feeling is unnecessary.

General Oribe, commander-in-chief of the Buenos Ayrean army, forgetting the grievances he *considered himself* to have sustained at our hands, rode down in person to visit the ship, and made us at once feel that we were the guests of a high-born Spaniard; it is needless to describe the effect that such sympathy and kindness had upon the officers

and men ; it was clear, that on assistance of every kind we could surely calculate ; what, therefore, was wanting, when the resolute and dogged perseverance of English seamen was at our command ?

When the gale had sufficiently abated, Captain Sulivan, of the *Philomel*, accompanied by the master of the *Gorgon*, proceeded to sound round the ship, and to buoy the positions where it was determined to place the anchors. The perfect knowledge of the harbour possessed by Captain Sulivan proved of great service to us in performing this duty, and it was no small relief to our minds to find that there was a channel of mud, not of water, it is true, but yet free from rocks, to enable us to escape.

As the anchors and cables arrived from the different ships, they were laid down as in the adjoining diagram :—

The anchor (1) is of 38 cwt., backed by another of 36 cwt. in seven feet water, bearing from the *Gorgon's* stern, south-east by south half south, two and a half cables' length ; the cables on this were of twenty-two inch ; (2) is of 71 cwt., backed by another of 34 cwt., in nine feet water, bearing south by east half-east, three and a-half cables' length ; cables twenty-two inch ; (3) is of 38 cwt. in seven feet water, south, one cable's length ; (4) is of 25 cwt. south, half west, one cable's length ; (5) 83 cwt., south-west by south, one cable's length. These anchors were laid down by the 14th May, with the exception of (3), which





is a bower anchor of her Majesty's ship *Vestal*, and was not placed till the arrival of that vessel in June. (1) and (2) are intended to be used as the heaving off anchors; the others are placed to guard against the possibility of the ship's quarter being driven higher up the beach.

Preparations had in the mean time been made on board, for landing the stores, coals, &c. The plan adopted for the purpose was this,—a kedge anchor was buried in the bank, twenty or thirty yards above high water-mark; to this was bent a six-inch hawser, which being first rove through a clump block with a hook strop, was then rove through a block at the fore-mast head, brought down on deck, and set up well taut; hauling lines were attached to the clump block aboard and ashore; the gear to be landed, was whipped up to the fore yard, where a hand was stationed to hook it to the clump block; the hauling line on board being then let go, the gear descended the hawser by its own weight. By this means, two hundred and eighty tons of coals, and all the smaller stores, were landed above high water-mark at once. The sketch annexed (fig. 1.) will better explain this operation; to us it proved of great value, and may often-times be the means of landing gear and stores from a ship wrecked in a surf, when other modes would prove ineffectual.

By the 18th of May, the ship was perfectly clear, with the exception of the engines, boilers,

guns, and lower masts ; all the stores, tanks, &c., landed ; the perishable articles, such as sails and provisions, were placed in storehouses near the beach. The engineers were employed dissecting the paddle-wheels ; the carpenters, making foundations for fixing the capstans in the sand ; and the blacksmiths were at work, making bolts, cleats, &c. in a temporary smithy, erected on shore.

It will be as well to give here a brief outline of Capt. Hotham's original plans, dilating and explaining as I proceed ; pointing out the alterations therein made, and the circumstances that brought them about. And first a word as to the engines : I believe it may be with propriety assumed that a very general impression has prevailed in the navy, that one of the great difficulties attendant on officers commanding steamers would be, getting them afloat, should any disaster throw them on shore. The necessity of removing the engines was always admitted ; and the minds of naval men had been turned to simplify a process considered as a *sine quā non*. It was reserved for the *Gorgon*, a vessel with engines of 300 tons weight, to prove to the world that an officer should consider well his position, before he adopted too hastily a plan that would inevitably render his vessel at once unserviceable. As a matter of course, the advantage to be gained by their removal struck every one ; but this was more than counterbalanced by the difficulties attending the operation, the expense to be incurred, and the

probable loss or injury of many small parts, and more than all, by the declaration of the engineers that the resources at their command were *not* sufficient for their restoration and re-erection. Weighing well the advantages and disadvantages held out by either course, it was wisely determined to retain them, and employ them as the principal moving power; but, as is, and ever will be the case, when any new idea is started, public opinion declared against it, the folly and madness of the plan was in the mouths of every body; still Captain Hotham remained firm, in defiance of the entreaties of his friends, and the ill-repressed hints of other self-constituted critics. His determination was, that the engines should remain on board, and be used as the principal power for transporting the ship.

The large heaving-off purchases, which would be worked by the engine, were to be applied to cables (1) and (2); they were not to be clapped on on deck in the usual manner, but to be lashed at the stern-posts to a swifter round the ship. The advantage of this is obvious, as it is a common rule in mechanics that a weight, to move by either dragging or lifting, should be slung as near the centre of gravity as possible. Another purchase was to be brought from cable (4) to upper deck capstan. But no purchases, however powerful, would have had any effect in moving the ship out of the bed of sand in which she was fixed; it would therefore be

necessary to construct a dock round her, by excavating the sand, and then to place longitudinal ways of timber under her bilge. In addition, it was requisite to dig a channel, of a cable's length, right astern, through which to drag the ship clear of the *sand* into the *mud*. Such were the means at first proposed to be employed to restore her Majesty's ship to her proper element; the above sketch of which will afford to the nautical reader some idea of the magnitude of the undertaking, even in contemplation. The above plans were put in course of operation as speedily as possible. A swifter, consisting of three turns of twelve-inch hemp cable, was passed round the ship as low down as the sand would allow, each turn being boused well taut, and the ends set up with a laniard to lashing eyes. The large purchases were formed of five eight-inch hawsers, rove through three and fourfold blocks, making eight parts; the fall was rove through the centre sheave first, thereby bringing a fairer strain on the strop. These purchases, being overhauled, as far as the falls would allow, were carried out in launches, and the fourfold blocks lashed to their respective cables with a roundabout silvagee lashing. The other blocks were then brought in, and lashed to the swifter at the sternpost; and the falls, taken to the paddle-shafts on each side, being brought to with four turns between the two inner bosses, the space between which had been filled

up with wood, like the whelps of a capstan, to about four feet in diameter. Another threefold seven-inch purchase was clapped on No. (1) cable, the fall being led in through the after main-deck port, and brought to main-deck capstan. The purchases were then hove taut and secured.

Now commenced the arduous task of constructing a dock and placing the ways. The plan first proposed for the dock, was to excavate the sand from under the ship's bottom to a distance of twenty feet from the vessel; the side of the dock to be sloped down towards the keel, and then faced with mortar, which was made from the clay found on the shore. It was imagined that this mortared surface would be rendered sufficiently hard to resist the action of the water undermining or washing the sand down. One hundred shovels were soon set to work, the sand as it was thrown up being formed into a bank beyond the edge of the dock, and also faced with mortar, to prevent the wind from blowing it down. This was the labour which constituted the principal occupation of the seamen for a space of upwards of five months. Oftentimes did the banks give way, or the surf break down our defences; not unfrequently was the labour of a month destroyed in a few hours, and new demands made on the energies of the seamen and the resources of the officers, but both were ever ready; a few hours despondency, and the shovels were again at work; and although a very general feeling existed as to the inutility

of the operation, we scarcely ever heard a murmur, or witnessed a relaxation of zeal.

As the sand was cleared away from the vessel's side, shores were placed to prevent the possibility of any accident occurring, in the event of a heavy surf setting in, or other causes tending to throw the ship on her bilge before all was in readiness for heaving her astern. The method of fixing the shores is shewn in fig. (2). A trench is dug in the side of the dock, for the reception of a balk of timber, which is laid horizontal, and athwart the direction of the keel, for the shore to step upon; the head of the shore bears against the upper main-deck port-sill, and the heel being wedged in well taut towards the ship's side, it is then cleated on the step.

The ways were placed as soon as the ship's bilge was sufficiently clear of sand to render it practicable. In the first instance, they consisted merely of fore and aft balks of timber, supported by short transverse pieces and wedged close up to the ship's side, as in fig. (3); but the first breeze shewed that the subtle nature of the sand required something more firm and substantial to resist the action of the surf, which washed away the greater part of the ways on the port side, and loosened, so as to render useless, those on the starboard side. The next plan was to bolt them securely together in lengths of about twenty-two feet, as appears in fig. (4), the transverse pieces being hollowed out to

Fig. 1.

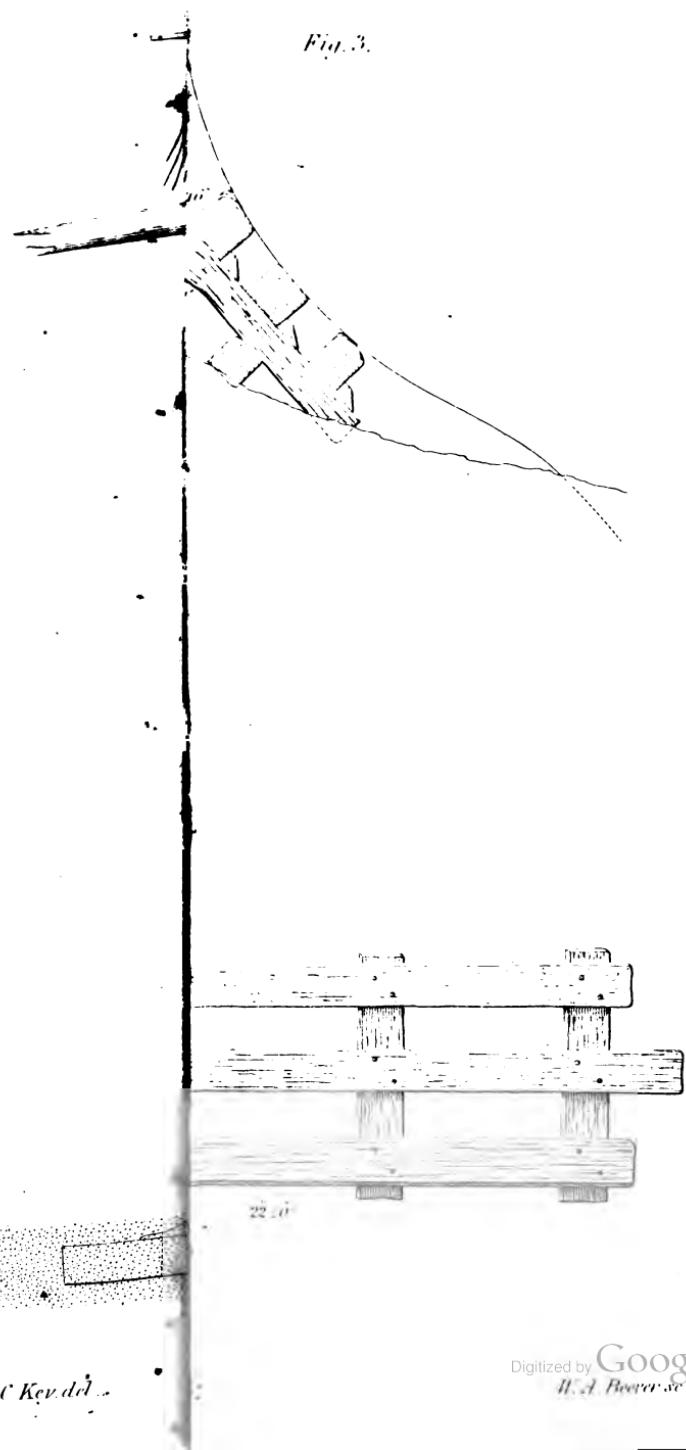


Fig. 3.



correspond with the round of the ship. Three of these lengths were placed on each side; the lower ends of the transverse pieces being forced down to within three feet of the keel, and bearing well on the sand, the upper ends were then hove up with screws and wedges, till the longitudinal ways pressed close to the ship's bottom; they were then fixed in this position with chocks of timber.

It must be borne in mind that, up to this period, the practicability of attempting to form a dock on the port side had not been entertained. Whenever the wind blew from the southward, a very heavy surf broke against the ship's side, and in strong gales, frequently over the quarter-deck. With these disadvantages before us, no one believed that a temporary dock could be constructed in such a quicksand, unless a coffer-dam was first erected; and Captain Hotham did not consider himself justified in incurring such an expense, without the sanction of higher authority. The object, therefore, of our endeavours at this period may be considered to have been, to lift the ship by casks, lighters, &c., on the starboard side, and in addition, to assist the purchases by placing her on ways, thereby offering a hard, greasy surface to move upon, instead of sand.

But these excavations could only be continued at low tides; at other intervals, the crew were employed in clearing and lightening the ship in every possible way; finally, nothing remained but

the guns and lower masts, the removal of which would require all the skill and seamanship of those on whom rested the responsibility. First, as to the guns. The reader must bear in mind that, at a high tide, there was only three or four feet water under the port quarter; from thence, forward, and all on the starboard side, was dry. As the guns were to be shipped on board the *Alfred*, they would require to be struck directly into her boats; here was the difficulty; a derrick must be employed, but could not be stepped opposite the main-mast: a glance at the annexed sketch (fig. 5) will show the little stability a derrick in that position appears to have, and what great care was requisite in the position of the guys. But in this, as in other similar cases, the knowledge of the difficulty acted as a safeguard; no precaution was spared, nothing was hurried, and our two 84 cwt. guns were struck safely into the boats. The mode of rigging a derrick is too simple to require explanation—whether large or small, the process is similar. But perhaps I may be permitted to remark upon the unwise custom, too common, of leaving behind at the dockyard spare spars, purchase blocks, &c.; our derrick was the spare handmast, and we had no other equal to the weight; it had frequently been looked upon as useless, as an incumbrance to the quarter-deck—in fact, an article that ought to be removed the first opportunity, no matter how. Yet this very

Fig. 5.

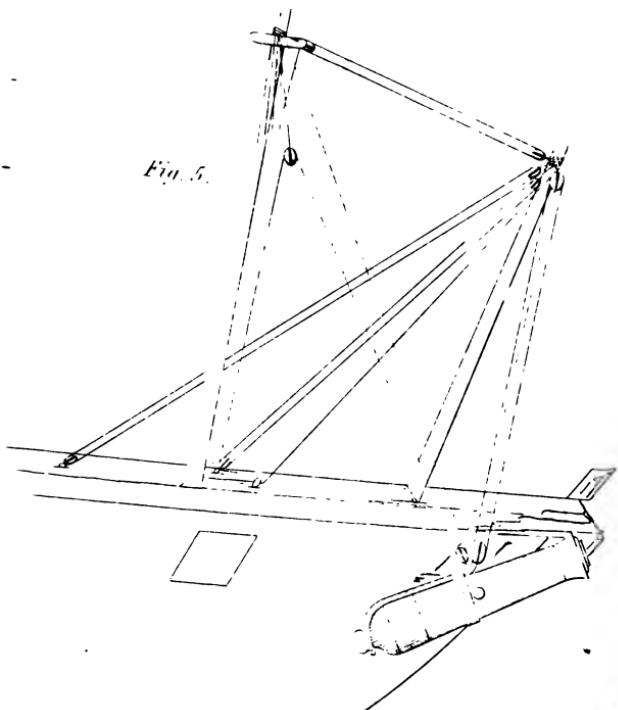


Fig. 6.

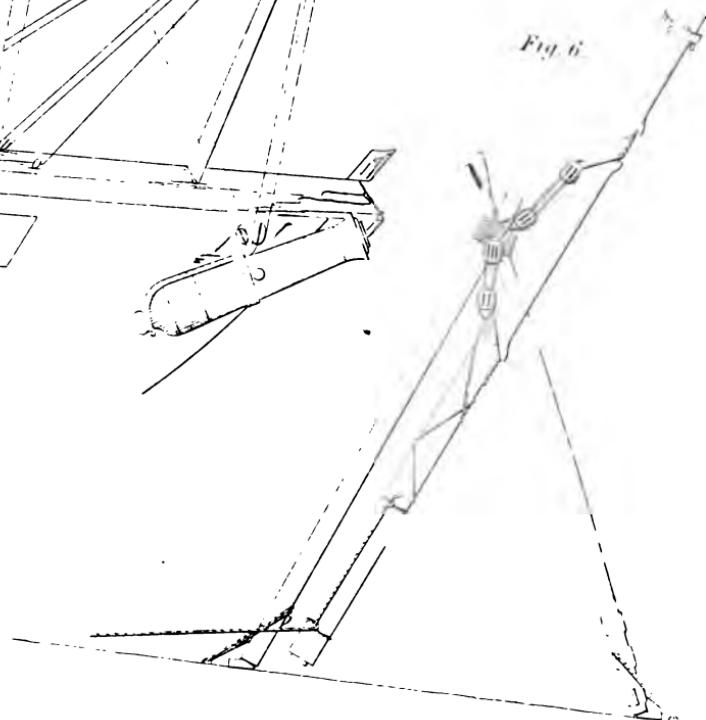
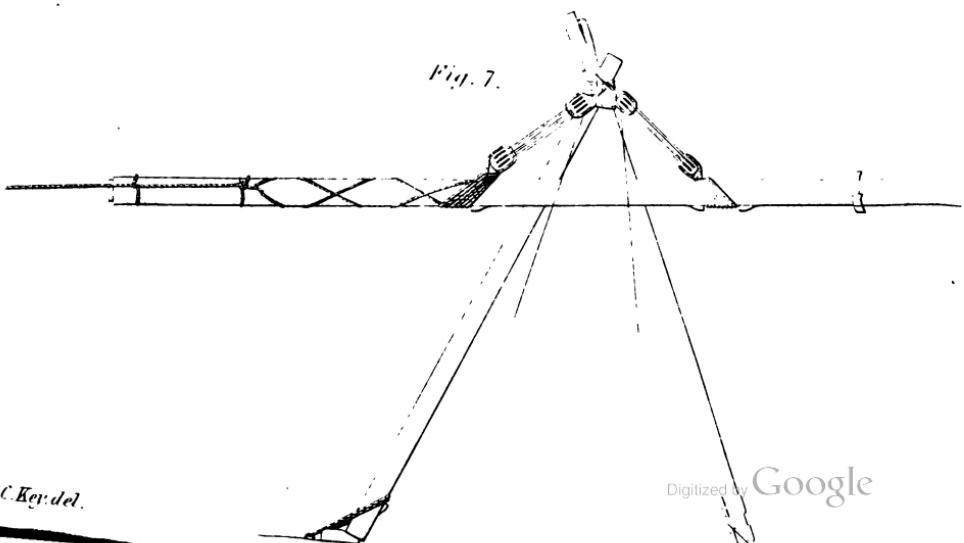


Fig. 7.





spar took out our guns, bowsprits, masts, and, as will afterwards be shown, was of extreme use in connecting the powerful application of screws with the ship. The guns being removed, no further necessity remained for retaining the lower masts; freed from them the ship would lie quieter and strain less, and a weight of about twenty-eight tons would be removed. Commencing, then, with the bowsprit; our old friend the hand-mast was rigged as a derrick, the topping lifts taken to fore-mast head, and the guys to each cat-head; it was then swayed out with a twofold purchase and single cap guy, landed, and hauled up on the beach. The sheers, consisting of the main boom and hand-mast, were then rigged for the foremast; being laid with their heads forward over the night heads, they were lashed together as high as possible, with eight racking turns and eight roundabout turns of three and a half inch rope. Over this was lashed the upper purchase block, then a single block for the mast-head guy, and over all, the blocks for the fore and after guys, which, when rove, were taken respectively to the night heads and main-mast-head. The mast having been carefully measured, the sheers were raised by the topping lift that had been used for the derrick; the lower purchase block was lashed and cleated on the mast low enough to carry the heel clear of the partners, the mast-head guy was doubled, the block lashed round the mast-head. The purchase fall was then

brought to the capstan, and the mast hove up; when nearly clear of the partners, the slack of mast-head guy was taken down, and a hawser clapped on as a heel rope, which was led on shore. When the heel was clear of the ship's side, the purchase and guy were lowered; the mast hauled on shore by the heel rope, easing the mast-head down clear of the ship's side by means of the double guy.

The sheers were then transported aft, by the heel tackles and mast-head guys, for the main-mast; but a new application of purchase would be required here; when the mast was measured off, and the lower purchase-block lashed, it was a very few feet from the deck, consequently, considerably below the centre of gravity; another purchase was therefore lashed round the sheer-head, above and abaft all, and its lower block was dogged on a few feet below the cross-trees. The proportions of the mast and sheers are as follows:—the main-mast ninety-seven feet long, and houses twenty-two feet; the height from upper purchase-block to the partners is fifty feet. As an additional security, a guy was taken from the sheer-head to the shore to prevent the possibility of the sheers capsizing. When the heel of the mast was a few feet from the partners, the upper purchase was hauled taut, and heel-tackles clapped on; as soon as the heel was clear, the order was given to ease away the upper tackle; the mast then lay nearly horizontal, and

perfectly manageable, suspended by the two purchases, as shown in fig. (7). The heel-rope was then taken to a capstan on shore, and, without entering further into the details, the mast was safely landed without casualty or delay. After this extraordinary disproportion between the height of the mast and sheers, never let it be again said, that a vessel cannot take her own masts out, for want of spars for sheers.

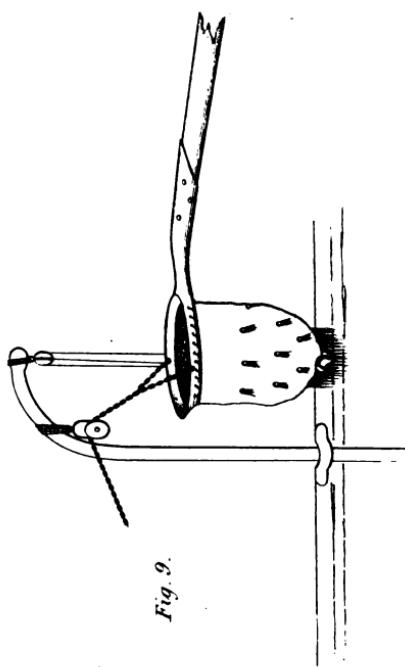
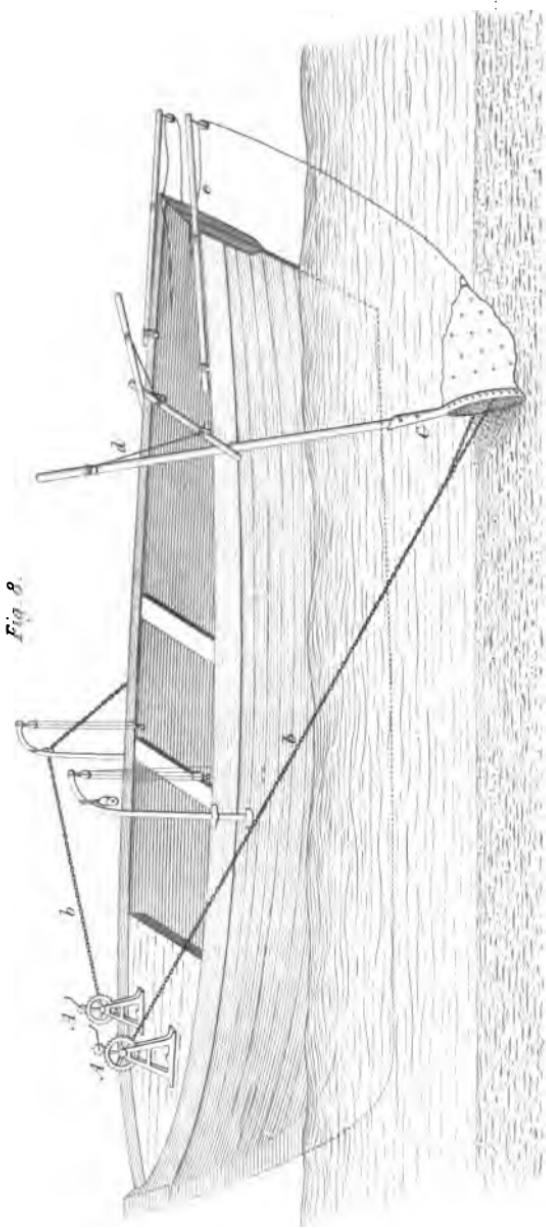
There remained nothing now to divert the attention from the dock; as yet, it had baffled all our efforts; attempts had been made to give a new direction to the surf, and with it the sand, by placing tanks filled with water close to the cut-water, extending from the vessel forward in the direction of the keel, securing them to strong piles driven seven or eight feet into the sand, but without success; we soon discovered to our dismay, that wherever water could find an entrance, sand would be brought in and deposited; in fact, the sandy beach appeared, when disturbed by the surf, to follow the well-known hydrostatic law of finding its own level. This was discouraging to the men, as every day their labour consisted in excavating the sand that had been deposited the previous night, but it was the only alternative; unless the sand could be excluded, the *Gorgon* must remain; a sense of this wrought a corresponding feeling on the minds of the crew, and effectually checked despondency.

At such a moment, every little incident was of value ; on the completion of the excavation of the starboard-side, we were gratified to find that no damage to the ship could be discovered, beyond five feet of the gripe being turned on one side, and a sheet or two of copper rubbed under the bilge, forward ; this, combined with the reports of the engineers and carpenter, that the ship was not strained, tended to reanimate everybody, and made all join in one determination, not to leave so noble a ship uninjured on the beach.

During the last fortnight, the engineers had been preparing and fitting apparatus to a launch of thirty tons for lifting mud, and its arrival was looked forward to with anxiety, it being very doubtful whether the channel intended to be cut astern of the ship would remain free ; if not, an immense additional expense must be incurred. At last the long looked-for craft made its appearance ; the ship's company were divided into four watches, one watch to be continually at work in this mud-boat, *day and night*, the remaining three employed with their shovels on the sand.

Fig. (8) represents the plan of the mud-machine, and the method of working it. The launch is forty-two feet long, and fourteen feet beam. A A are iron winches of a multiplying power of ten, they are bolted firmly to the head-sheets on each side ; a chain, b b, secured to the hoop of the mud-bag, passes round the axle of this winch. C is the





iron hoop and socket to which the mud-bag is laced; in this socket is fixed a spar fourteen feet long, at the upper end of which is a rope stopper, *d*: *e* is an outrigger, with a tail block, through which is rove a tripping line, that is secured to a becket in the bottom of the bag: the bag is of leather, the mouth three feet in diameter, its depth two feet. This apparatus is fitted on each side of the boat; it is worked by twenty men. The chain being well overhauled, the bag is boused as far aft as possible by the tripping line, which is then let go; the stopper is hauled taut, and a turn taken round the athwart-ship spar; this keeps the hoop close down to the bottom, and is eased as the chain is hove in; when the spar is up and down, the chain is put in the snatch, *f*, and hove close up; the jigger is then hooked on to the bucket, as shown in fig. (9), and the mud and sand capsized into the paddle-box boats, which are moored on each side of the lighter, allowing room for the bucket to work between them.

By this machine, on an average, eighteen buckets were hove up every hour, each bucket containing 5 cwt., clearing away, therefore,  $4\frac{1}{2}$  tons of mud and sand per hour.

Having procured sixty butts from the town, they were made water-tight, and slung, preparatory to being lashed to the ship's bottom; bolts were nailed on, for the purpose of securing two tiers of these casks, which was done by means of slip-

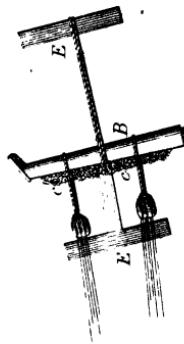
ropes, as will be seen by *cc* in fig. (12); each tier of casks required two tiers of bolts, four bolts for each cask; the slip-ropes, being spliced into the slings, were rove through the two upper bolts passed round the cask, then through the two lower bolts, and the ends taken up on deck, bousing the casks close to the ship's side with a jigger, then belaying, and racking the slip-ropes. The upper tier was about in a line with the eleven-feet water-mark; the lower, as close down as the ways would allow.

The intention of using the engine as the moving force, placed at our command what might almost be termed an unlimited amount of power. The engine is nominally capable of exerting a force equal to that of raising 4268 tons a foot high, per minute. The plan proposed of applying this power to the cables, through the medium of the paddle-shafts, would, on account of the difference of radius of the shaft and crank, increase that power in the proportion of 11:8; this will show that, so long as our resources could supply cables of sufficient strength, we never should be at a loss for power to apply to them. Now, these resources were wanting; the squadrons, English and foreign, had supplied us with all that could possibly be spared, and yet we had but two cables (22 inch) to which purchases might be applied; the extreme tension these two cables were capable of sustaining, was equal to about 220 tons. From this it is very evident that





Fig. 10.



W. A. Beever, sc.

London, Smith, Elder & Co. Cornhill.

J. C. Kirkaldy.

the utmost care in the management of the engine was required, to prevent the (to us) fatal accident of carrying away a cable. The possibility of relieving these cables from bearing the whole of the strain, occupied Capt. Hotham's attention for some time; he at length hit on a plan, and immediately put it in operation; it will be understood by reference to fig. (10.)

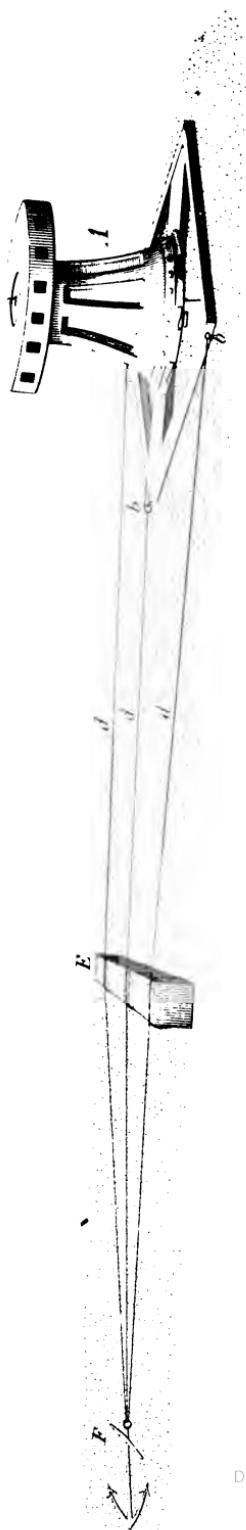
*A A* represents the round of the ship's bow; *aa* the water's edge. The bowsprit, *B*, is buried in the sand to the depth of about three feet, just clear of the water's edge at an average tide, and abreast of the ship's quarter, its length being in a direction at right angles with the keel; to this are lashed two 22-inch treble blocks, their strops being long enough to allow the blocks to lie above the surface of the sand; pigs of ballast, lengths of chain cable, and other weights are piled up, above and in front of, the bowsprit, as shown by *cc*, for the purpose of rendering it less liable to be started from its bed; in addition to this, it is backed by two balks of timber buried in the sand, one six feet before it, the other six feet abaft it, as shown in the plate by *EE*; two other treble blocks, *DD*, are toggled in the bow part by means of a short piece of timber 16 inches square, *BB* fig. 12; two purchases are then rove with  $6\frac{1}{2}$ -inch hawsers through these blocks, and those corresponding to them on the bowsprit, the standing parts made fast on the main deck, ready for slipping, if required,

and the falls taken to two capstans, *s s*, fixed in the beach for that purpose.

It would at first appear no easy matter to fix capstans on a soft, sandy beach, so firmly as to withstand a strain of fifty men heaving their strength on them. The method, however, is perfectly simple, and, as proved by us during a space of five months, perfectly serviceable. Fig. (11) is intended to represent the plan. *A* is a frame of timber resting on the surface of the sand, forming the bed; the diagonals are eight feet in length; in the centre is a hole in which is fixed a square socket for the reception of the iron spindle; *b b* are ring-bolts in the frame, to which are secured the mooring chains, *d d*. *E* is a balk of timber fourteen feet long, sunk four feet below the level of the sand, and laid so that the chains may lead in a direction opposite to the intended lead of the fall; the three chains are passed round this timber, and are then bent to the backing kedge, *F*; notches for the pauls to drop into; are cut in the bed.

It is evident that, whatever strain these purchases would bear, would afford so much relief to the cables, and if they were found perfectly efficient for the purpose intended, they might be multiplied to any extent. One great advantage consisted in working them entirely on shore, thereby relieving the ship from the weight of the men required to man the capstans; the only fear entertained with regard to them was, the probability of the bow-

Fig. II.





sprit coming home, as when the tide rose, the water washing round it would be liable to loosen the sand, and weaken its hold ; this, however, could only be learned by experience.

From what has been before said, there still clearly existed a deficiency of power ; in anchors and cables our resources were exhausted ; the east coast of South America could not produce cables of sufficient size to be serviceable ; some new application of mechanics must be called into play, or the enterprise abandoned. But the emergency had been foreseen. About this time the *Viper* arrived from Buenos Ayres, bringing ten screws especially adapted for ship purposes ; and from Monte Video we procured three other more powerful ones, usually employed for pressing wool ; one capable of sustaining a pressure of upwards of 100 tons, from the American house of Zimmerman, Frazier and Co. ; two lent by our countryman, Mr. Jackson, and also two bell screws from the house of Jno. Gowland and Co.

The application of these screws will, I think, be considered ingenious, and requires a full and exact description ; but, however useful and advantageous they may have been, however perfect the success of the experiment, I still am confident that the main advantage derived was in diverting the thoughts and attention of the officers and men from their monotonous and laborious duties, and impressing on their minds an inward conviction

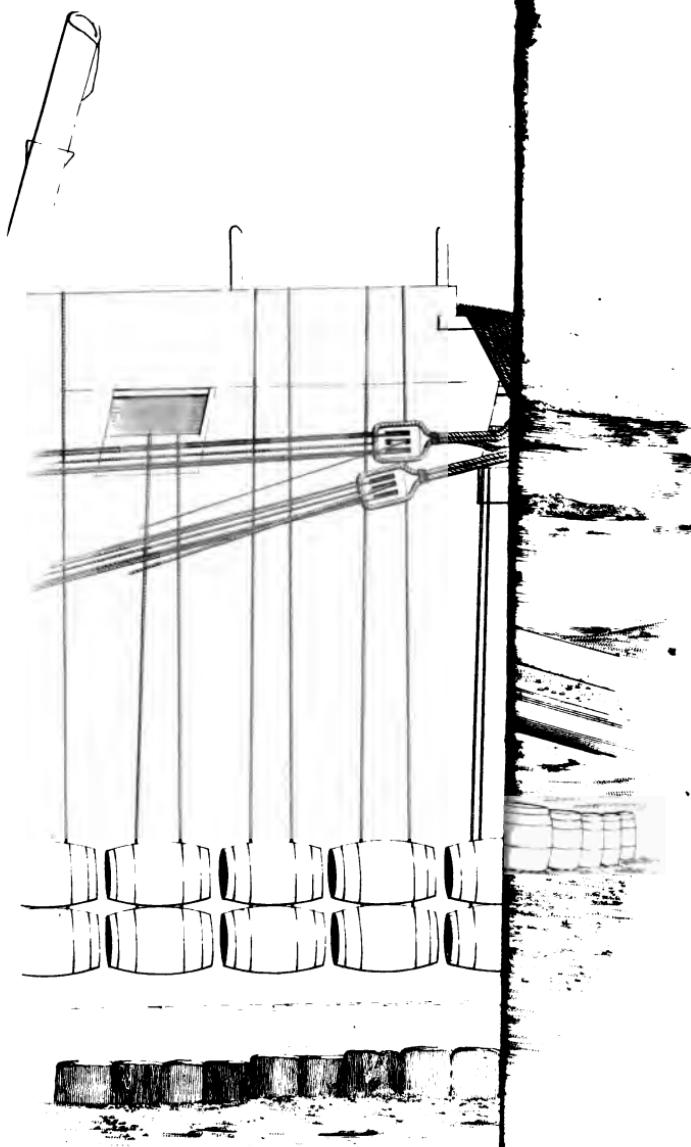
that “the *Gorgon* must go.” Thus, a moral victory was acquired over the incredulity so inherent in men’s hearts, and the first and most important element in any undertaking secured, I mean—Confidence.

I trust no one will disparage the above remark, albeit but ill expressed, as showing a want of influence over the seamen. Let no stern disciplinarian assume, that authority and power can carry him through difficulties such as ours: in the hour of battle, excitement and other passions obtain the mastery, and the defects of such a system may not be observed; but I am convinced that, to conduct an enterprise which must of necessity make a continual demand on the greatest physical exertions, as in our case,—where the men had daily to contend against cold and wet; where the labour required consisted in the filthy occupation of lifting mud and removing sand, to be washed back by the force of an untiring and irresistible element, almost as quickly as it may be excavated, and this, continued without intermission by day or night, for months—no commander can have the most remote chance of success, who cannot inspire those under him with a conviction that, sooner or later, their exertions will meet reward, although unforeseen difficulties may postpone the day.

This may be considered a digression, but let the reader excuse me; I have ever thought that there was much to gather, besides the bare narrative of



VII.



A. C. Key del.

86.

our adventures, and frequently have I pondered over the whys and wherefores of a system, which kept together men from different ships which preserved strict discipline, and induced men to labour and toil with an eagerness as great as if each had a direct interest in the successful result.

To return then, to the subject of the screws. It was decided that the larger one could be most effectually applied as a lifting power at the bow. Even when the dock was completed, there would naturally be less water to sustain the body of the ship forward than aft; any weight, therefore, that could be removed, should be from the fore part of the vessel. By applying the screw to the stem, in a nearly vertical direction, the effect would be the same as if a weight equal to the direct vertical pressure of the screw had been removed from the ship.

By referring to fig. (12), the foundation and method of working this screw may be understood. The frame-work, *A*, is formed of solid balks of timber, 22 inches square, bolted together, the upper timbers having a score, *b*, hollowed out for the roller of the bed to work in. *C* is a bed of solid oak, with a hole through the centre large enough to allow the screw to pass easily; an iron socket is bolted over the upper part of the hole. *D* is an iron wheel, filled in with wood, for the reception of capstan bars; in the centre is the female screw. This wheel works on the socket;

but to diminish the friction, round shot are placed in a groove round the screw, between the two iron surfaces on which the wheel revolves. The head of the screw bears against a notch formed in the cutwater, an iron plate being placed over it to prevent the pressure from injuring the wood ; an iron bolt, fixed in the head of the screw, is lashed to the cutwater, to prevent the screw from twisting with the wheel when hove on. *PP* is the platform rigged for the men to stand on, when heaving at the bars.

The smaller screws were differently applied ; being intended to assist in starting the ship out of her original bed, their power necessarily must be exerted as nearly horizontal as possible ; hence arose a difficulty : what foundation could be placed to withstand a horizontal pressure of upwards of 200 tons ? A reference to fig. (18) will show how this was accomplished. Once more the hand-mast was called into play, that and the mainboom being the medium through which the power of the screws was applied to the ship. The ends of these spars were placed to bear against chocks of timber, firmly bolted and cleated to each bow, a little below the bridle port (as shown in fig. 12 at *B*) ; the pressure of the screws is then exerted at the other extremity, in the following manner :—

In fig. (18) *a* is a square piece of timber, 16 feet long, 14 inches square, to each extremity, and on opposite sides of which, are bolted the



Fig. 13.



A. C. Hey del't

London, Smith, Elder & C<sup>o</sup> Cornhill.

J. E. Wood sc.

ends of four timbers, *b b*, of equal dimensions with *a*. A moveable timber, *c*, is then laid parallel to *a*, its ends being placed free to slide between the timbers *b b*. This frame being completed, a cavity is dug in the sand, about three feet deep, in which it is placed: behind the timber *a*, piles are driven three or four feet in the sand, to give the whole foundation a firm bearing. This is placed at such a distance from the ship's bows, that when the head of the spar rests against the chocks before-mentioned, the spar being laid in a fore and aft direction, the heel may exactly meet the timber *c*, against which it bears, as (*B*), leaving space between *a* and *c* to place the screws (*s s s*), as shewn in the fig. (13). The screws being then hove up with levers, their power is evidently exerted in the direction of the spars, which were found to make an angle of  $10^{\circ}$  with the horizon.

If the movement of the ship, or other cause, should allow the screws to be hove up to their full extent, by turning them back, and interposing chocks between the heel of the spar and timber *c*, they may be worked as before.

The construction of these foundations occupied our shipwrights several days, especially as a part of them were employed in repairing and placing a deck on a lighter, which had been hired, to be lashed to the ship's quarter, when properly strengthened and secured. The idea of placing large lighters or other vessels under the bilges,

thereby making their displacement available as a lifting power, had been early contemplated by Captain Hotham, who, on a former occasion, had seen the bow of her Majesty's ship *Terror* lifted off the sand by that means, when every other effort had failed; it also occasionally happens that when a heavy ship grounds either forward or aft, in going in or out of dock, in consequence of the spring tide not reaching its accustomed height, recourse is had to artificial help of this description for her removal. But the expense and anticipated difficulty of securing them, where so heavy a surf occasionally broke, were the principal objections. By hiring a lighter at a moderate daily charge, the first objection was partly removed, and it was imagined that experience would teach us the best method of surmounting the second. It was therefore decided to lash them on the lee side only, until some idea of their strength could be estimated. The first plan was this: having, by dint of some trouble, succeeded in passing four parts of a stream chain under the after part of the ship's keel, advantage was taken of a low tide, to bring the lighter into the dock, under the starboard quarter; then passing these chains round her, they were brought up on deck over the port quarter, and housed well taut. Three spars were then stepped as shores on the deck of the lighter, right amidships, and over well supported beams, their heads extending a few feet above the head of the quarter-deck, were there

securely lashed and cleated to ringbolts : lashings from the stem and stern of the lighter were also taken to bolts in the ship's side, to prevent any motion in a fore and aft direction ; to act as a sort of counter-balance to the power of this lighter, two iron cylindrical boilers were secured under the port quarter, by means of chains passing under the keel.

For three weeks after the gale by which we were driven on shore, the weather had been remarkably fine ; the first week in June, however, shewed signs of an approaching change. The barometer began to fall, and everything indicated a pampero, which, unprepared as we then were, might be productive of great damage ; however, all that foresight could suggest, or labour accomplish, had been done ; due preparation was made to heave, should the rise of the water afford any room for hope ; but Captain Hotham had resolved to run no risk of carrying away a cable by an ill-timed effort, or of damping the confidence of the crew by an unnecessary failure. Meanwhile, the strength of the men was giving way ; the same cheerfulness and goodwill existed, but their countenances shewed signs of exhaustion and fatigue, and the period had evidently arrived for further help. Application was therefore made to Commodore Purvis for additional hands to work the capstans, and 50 men were immediately sent from the *Alfred*, 50 from the *Curaçoa*, 30 from the *Philomel*, and

12 from the *Ardent*. With such a large body of men it would be necessary, in case of any sudden rise of tide by night, or other emergency, to frame a station bill, and to give distinct orders, providing for any accident that might occur. The following was therefore drawn out, and made known to the officers and men.

#### STATION BILL.

“Purchase Falls.”—Shore capstans: *Alfred's* men (50); *Curaçoa's* men (50). Their duty afterwards (in case of the ship leaving the beach) is to haul up spars, secure ways and shores. The standing parts of purchase falls are to be slipped when the purchases are no longer required; to this the gunner attends on main deck. The words “Avast heaving,” will be six quick rings of the bell.

Lieut. —— commands on shore; to provide himself with a union jack, and to march the men afterwards round to the town.

“Starboard long purchase” is worked by starboard paddle-shaft, 1 boatswain's mate, 2 forecastle men, attend it with levers.

“Starboard short purchase” is worked by main-deck capstan. Boatswain's mate of the *Ardent*, 2 *Frolic's*, 13 *Ardent's*, 12 *Philomel's*, 22 *Gorgon's* marines: total 49. Mr. ——, mate, and the gunner.

“Port purchase fall” is worked by port paddle-

shafts. Boatswain's mate of *Philomel*, and 2 gunners attend it with levers.

“Quarter cable is worked by upper-deck capstan. Manned by 1 boatswain's mate, and 59 seamen (*Gorgon*). Lieut. — to command.

“Boatswain's party,” 1 quarter-master. 10 seamen (*Gorgon*).

“Carpenter's party,” 5 carpenters (*Gorgon*), 7 carpenters (*Alfred.*) 1 carpenter (*Philomel*).

To bouse in slack of large cable over the stern. Mr. —. 13 boys.

“To work screw,” Mr. —, engineer. 13 seamen (*Philomel*.)

“Engine room,” stokers, engineers' boys, Mr. —, 1st engineer.

The “Master” to attend shores.

A carpenter to burn a barrel of pitch on the beach in case of heaving off at night.

The “carpenter's” duty is to see the ports secured, scuppers plugged, shores hung, and his crew properly supplied with mauls, axes, &c.

I have before alluded to the kindness and civility of General Oribe. As the works were now in a forward state, and the weather appeared settled, Captain Hotham determined to avail himself of the opportunity to pay Don Manuel, whose attention continued unremitting, a formal visit. After our recent incessant labours, a relaxation of this kind was eagerly hailed by all; volunteers were not wanting among the officers to form the party, and

a sufficiency of horses having been procured, at noon on the 9th June, we started for the Cerrito, round which the encampment of his army was formed. Thanks to the miserable condition of the horses, after an hour's ride we arrived at headquarters, and were separately presented to the General, to his ministers, and staff.

Don Manuel Oribe is in appearance about fifty years of age, gentlemanlike and prepossessing; in his deportment and manners realising the idea I had previously formed of the Spanish Caballero. Nothing could be more courteous than our reception, he repeated his regrets at our disaster, his anxiety for our delivery, and the interest all around took in our labours, and he certainly succeeded in convincing us that, as far as might depend on him, we should want for nothing; the conversation soon turned on steam, gunnery, &c., and the alterations to be made in a future war through the agency of that power; with all these subjects His Excellency appeared tolerably conversant. Suddenly addressing the Captain, he said, "I have two 'Gatos' which I shall be happy to send to you." As the Captain knew no other translation for "Gatos" than "Cats;" and as it appeared very odd that Don Manuel should make him a present of cats, he turned to the minister Don Carlos Villa de Moros, and asked him in French, the meaning of the word "Gatos," he received a similar explanation; there appeared no

longer any doubt as to his intention, it was quite clear, albeit most strange, that His Excellency meant to make Captain Hotham a present of two cats, and was assured that, as rats abounded in the *Gorgon*, they would be cherished and petted; the attention was felt as considerate and kind. No further explanation took place, and to conclude the mystery at once, I must here say, that after our return to the ship, day after day elapsed, still no cats; at the expiration of a month it was finally explained, by our learning that in technical mercantile language, "Gatos" means, screws, which I need not add were never sent, after the declared intention of Captain Hotham to *keep* them as a memento of the kindness and friendship of His Excellency Don Manuel Oribe. Finally, we took our leave, and cantered back with increased energies and an elasticity of spirits which a little deviation from the strict line of routine and duty is sure to occasion.

On the 13th June the wind set in from the south-east. The swell prevented the mud-clearing machine from continuing to work, she was therefore moored off. The water in the bay gradually rose, but not to the height we expected, owing to the wind being so far to the eastward. By observation and inquiry, we had ascertained that the highest tide that could with any degree of certainty be expected, would bring the water on a level with the twelve feet mark on our sternpost,

which, for the present, might be considered as a fixed point ; that mark was therefore taken as the standard to which the height of the tide was always referred ; for instance, what we termed a ten-feet tide was not so called on account of the depth of water, but because the water was on a level with the ten-feet mark ; as at that period, and for some weeks after, the after-part of the keel was imbedded, at the least, three feet in the sand, in this instance specified, the actual depth of water was no more than seven feet.

As the tide rose to the ten-feet mark, the fires were lighted in two boilers, and everything being prepared, the capstans were hove round, the screw hove upon, the quarter cables boused well taut, and then the engines set in motion.

The object in view was principally to discover any palpable error or omission in the method of working the purchases, &c., which experience only could bring to light. The result proved the advantage of it. In the first place, the action of the surf had so loosened the sand round the bowsprit, to which the shore purchases were lashed, that as soon as a heavy strain was brought on them, the bowsprit came home ; showing that something exposing a greater resisting surface, and sunk to a greater depth, was required to withstand the strain. The next difficulty was in the engine-room : it was, at first, found impossible adequately to regulate the speed of the engine, so

as to bring a fair and equable strain on the purchases. This proceeded chiefly from the want of the paddle-wheels, which would have acted the part of a fly-wheel, in assisting the engine to pass her centres ; the engine, in fact, was not what is technically termed, balanced. The cranks of the *Gorgon* engines are placed at an angle of  $110^{\circ}$  instead of  $90^{\circ}$ , with the proposed view of producing more equitable motion. In our situation, it was of decided disadvantage ; as when one engine was near its centre, ascending, the steam having been cut off by the lead of the valves at  $\frac{3}{4}$  stroke, the other is just commencing to ascend, and both are exerting their power at a very unfavourable angle ; if, then, the strain of the purchase is suddenly brought on the shaft at this moment, the before-mentioned want of a fly-wheel is seriously felt ; hence it was found that the engine at first refused to pass her centres ; and it was only after numerous consultations and conjectures, that the true cause was ascertained ; but by shipping a few arms and two iron floats, all future difficulty was overcome, and in the end we succeeded in driving the engine as steadily as if we had been at sea.

As the injection pipes were buried in the sand, the reader versed in the principles of steam will, doubtless, be curious to know in what manner a supply of injection water was ensured. A communication was opened between the blow-off pipe of the boilers not in use, and the bilge, by pushing

down Kingston's valve ; and to prevent too large a body of water being admitted, a dam was built up across the bottom of the ship, before and abaft the blow-off pipe. From this reservoir, which communicates with the condenser by the bilge-pipe, now fitted for that purpose in all steamers, a sufficient supply of injection water was procured to produce a moderately good vacuum.

After a few revolutions, the fires were put out, the water blown out of the boilers, and all hands set to work to continue the operations already in progress, alter others, and repair the damage done to the dock during the south-easterly breeze, which had lasted forty-eight hours.

We will now point out the improvements that had been suggested by the result of this experimental trial (as it may be termed). First, with regard to the dock, the fall of the tide showed us clearly, that some important alteration must be adopted in its reconstruction ; the sand had been washed in to its original level on the port side, and completely covered the ways on the opposite side ; the sand at the stern-post, which, before the gale, had been no higher than three feet, was now up to the five feet six inch mark. The construction of a coffer-dam appeared the only alternative, it was evident that nothing else would keep out the sand, and it had now become too important a point to allow a moderate expense to prevent its being put in execution ; and should, on consideration, a feasi-



Fig. 14.

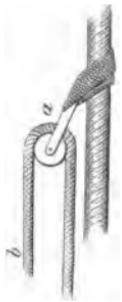
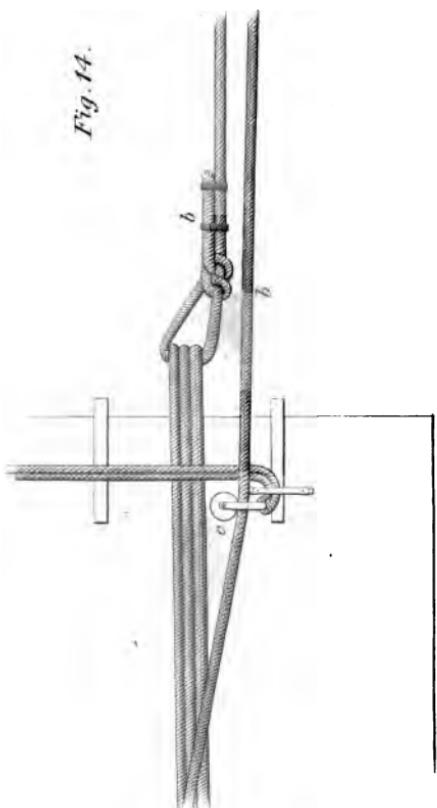
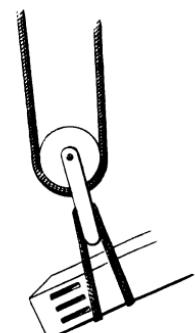
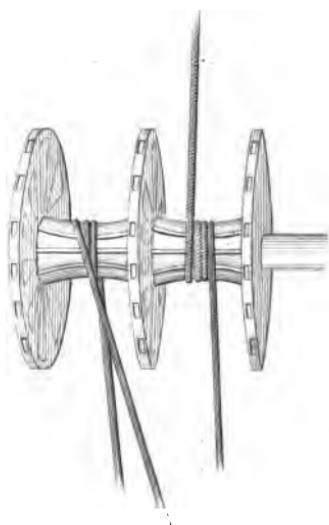


Fig. 15.



ble plan suggest itself, it was determined to clear the bilge of sand, take out the ways, and trust to the advantage gained by an increase of water for the loss thereof.

The main purchases next deserve our attention ; whilst heaving them taut, it was found that, from their long drift, it was impossible to keep them clear of turns, and being under water, it could not be observed directly whether they were clear or not. The difficulty of fleeting them, if required, was also very apparent ; they were, therefore, unlashed, and the following plan of viol purchases adopted in their stead.

Fig. (14) represents the viol as rove on the port side, the standing part of the seventeen-inch hemp cable (*b*) is made fast to the swifter ; it is then rove through the block (*a*), which is lashed on cable No. (2), as far out as the length of the viol (which is of two cables) will allow ; the cable (*b*) is then rove through the block (*c*), and from thence brought to the paddle-shaft. The blocks (*a*) and (*c*) are made from the forecastle messenger rollers, strapped with iron. A similar plan was adopted on the starboard side, except that the viol, which was of  $12\frac{1}{2}$  inch, was taken direct from the block on the cable to the paddle-shaft, as the lighter, which was secured under the starboard quarter, would not allow of a fair lead for the viol through a block on the stern-post.

By the direct application of these cables to

the paddle-shaft, a more powerful strain might be brought on them, without the same danger of parting as before; but how were we to hold on the cable before the shaft? It was too large to allow it to wind itself up, as had been done on the last trial: the unequal action of the engine rendered it unsafe, in fact, impossible, for any number of men to hold it on by hand; and, by bringing it to a capstan, many lives would be endangered should the engine take a back turn. After much consideration, the admirable plan, represented in the annexed diagram, fig. (15), was adopted. It is evident that by this all danger is avoided, as a revolution of the engine either way takes on a turn on each part of the shaft, and the men on the forecastle merely have to take in the slack as it comes off the outer shaft.

The defect of the shore purchases, which has been before noticed, was remedied by lashing one to the spare cylinder cover, sunk vertically in the sand; the other, to the spare rocking beam; and then piling ballast and chain cable over them, it was found that no impression could be made on them by the purchases, when heaving on the capstans full-manned. At this period, when, more than at any other, the exertions of the officers were especially directed to keeping up the cheerfulness and zeal which had animated *our own* men, and to infuse the same spirit into those who were now assisting them, it was of great importance that

no plan which had ever been undertaken should be abandoned, without attempting every possible modification of it. The great bond of discipline in any service is, the subordinates possessing confidence in the abilities of their superiors. Nothing tends more to shake this confidence than seeing a commanding officer in any emergency, hesitating or undecided; it would even appear that there *are* situations where, if an officer discovers an error in his method of conducting an operation, after having given orders for putting it in execution, it is better that he should persevere, rather than, for the sake of effecting his object in a perhaps more simple manner, he should risk the loss of that power over the minds of the seamen, which is obtained only by their placing implicit confidence in his infallibility. The above remark may appear irrevelant to the present subject, but it is an idea that frequently forced itself on the attention during the progress of our operations: and, if there had been occasion for its adoption, in no case would it have been more excusable; but, during the whole of the undertaking, no plan, with one exception, once commenced was abandoned: that exception was in the case of the ways; every other subsequent alteration was merely a modification of some part of the original plan.

In addition to the alterations already detailed, the rise of tide had shown that some more permanent method of securing the lighters must be

adopted, as the immense upward pressure, when the lighter was nearly *immersed*, had carried away lashings, spars, and bolts; nothing, in fact, withstood it. But, as it was very evident that, properly secured, they would stand the force of the surf and be of great service, a second was decked and strengthened in a similar manner to the first, and they were then secured as shown in fig. (16), an inspection of which will save farther explanation.

*a* is a balk of timber, 12 inches square, placed fore and aft the deck, and raised about 3 inches above it, by the chocks (*o*, *o*); this is bolted and clenched through the beams. *c*, *c*, *c*, *d*, *d*, *d*, are large iron eye-bolts, driven through the ship's side, and clenched in-board: the chains *b*, *b*, are rove through the lower bolts *d*, *d*, middled, and both ends brought under the lighter's keel, over the gunwale, round the timber *a*, and then boused well taut, rove through the bolts *c*, *c*, hitched, and seized. Previous to bousing taut these chains, the lighter is filled with water sufficient to sink her gunwale to a level with the upper bolts. She is then perfectly manageable, and may be placed in any position required. The chains being secured, the shores *e*, *e*, *e*, which have been cut to the proper dimensions, are stepped on the timber *a*, and their heads bearing against the supports *h*, *h*, which are balks of timber lashed athwartships on deck, with their heads projecting sufficient to give a bearing to the shores; they are secured, as shewn in the

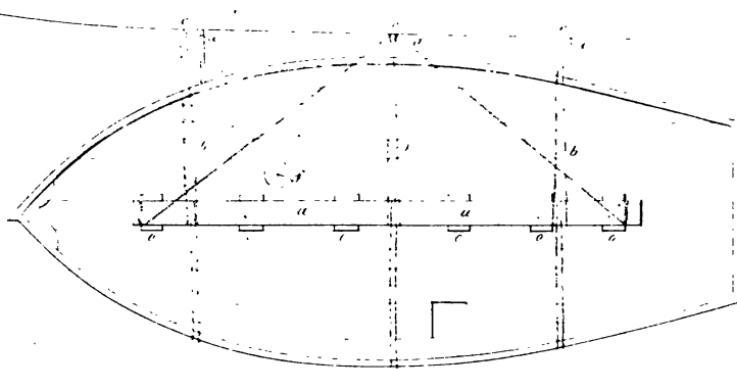


Fig. 16.

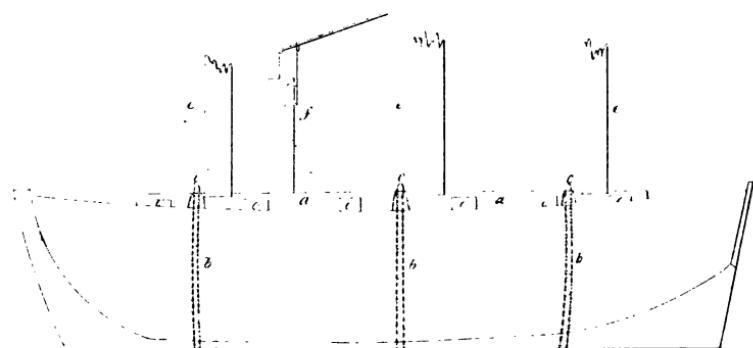


Fig. 16.

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plate, the lashings *g g*, being of chain, are not liable to stretch, which would have been the case had rope been used. When the shores are placed exactly as required, the lighter is pumped out by the pump (*f*), and then, as she takes her bearing against the shores, remains as perfectly firm and immoveable, as if built part of the ship.

To return now to the coffer-dam. Out of various plans proposed, a preference was naturally given to that of Mr. Milburn, a civil engineer, who had offered his services, in case of the removal of the engine, or any other operation in which his local and practical knowledge might be of value. His method was, to form the dam of piles of three-inch plank, and about one foot broad, driven four or five feet into the sand, the edges of each pile being grooved, and a batten of hard wood fixed in the grooves, as shown in fig. (17). The direction in which these piles were driven, on the port side, is denoted in the diagram by *a a*; they commence close to the ship's side, just before the paddle-box, and then take a direction to sea-ward, making an angle of about  $30^{\circ}$  with the keel, and extend nearly to the mud. The piles *b b*, driven on the starboard quarter, do not extend so far, but to a sufficient distance to be beyond the action of the surf at a high tide. *s s* is the water's edge. Should this coffer-dam prove of sufficient stability to withstand the force of the sea, one grand desideratum would have been effected; as it may be seen that,

from the position of the piles, any ingress of sand was prevented; for we had observed that the tendency of the surf was, not to wash the sand up *on* the beach, but *along* the beach; this, therefore, we laboured to prevent. If successful, the excavations might be continued on each side without the dispiriting failures we had so often experienced. Hopes easily dispelled indeed! After eight days incessant labour, in the water, by day and by night—strictly and literally without an hour's intermission—the last pile was driven, and the morning after, as if in derision of our futile efforts, a strong south-east breeze sprang up, and, as the surf set in, the piles were forced out of the ground one by one, till the whole of them were driven on shore. From this incident, an inference may be drawn of the difficulty of the task we had undertaken; for here was a civil engineer, of experience and information superior to the generality of his class, completely foiled on his own ground,—baffled in the attempt of an operation which formed a branch of his particular profession,—to us it certainly was disheartening, and the general exclamation prevailed—“What can be found to resist this surf?”

However, the piles round the starboard quarter, being protected by the ship, remained uninjured, so the wreck of our port breakwater was gathered together to be united to the piles already driven on the starboard side, there to form a solid substantial

Fig. 17.

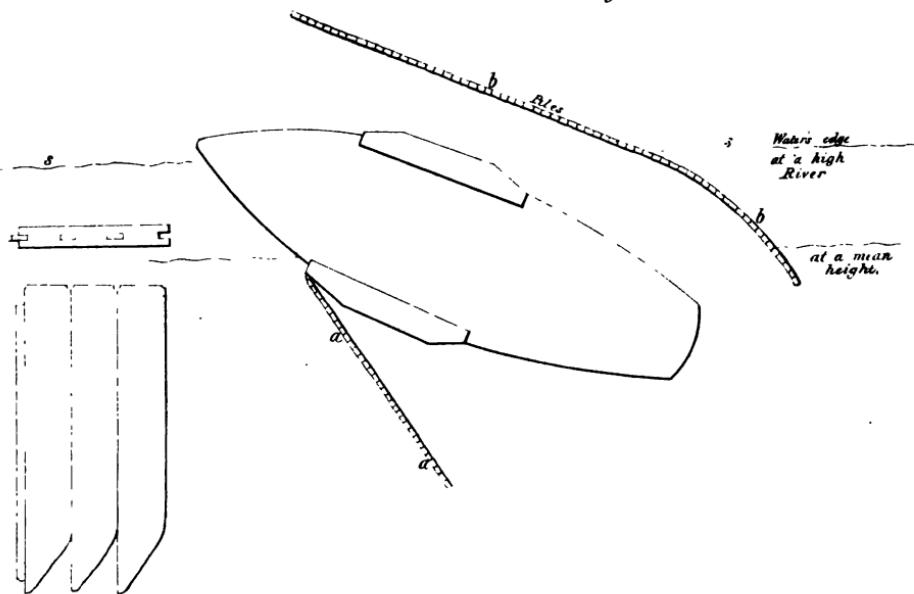
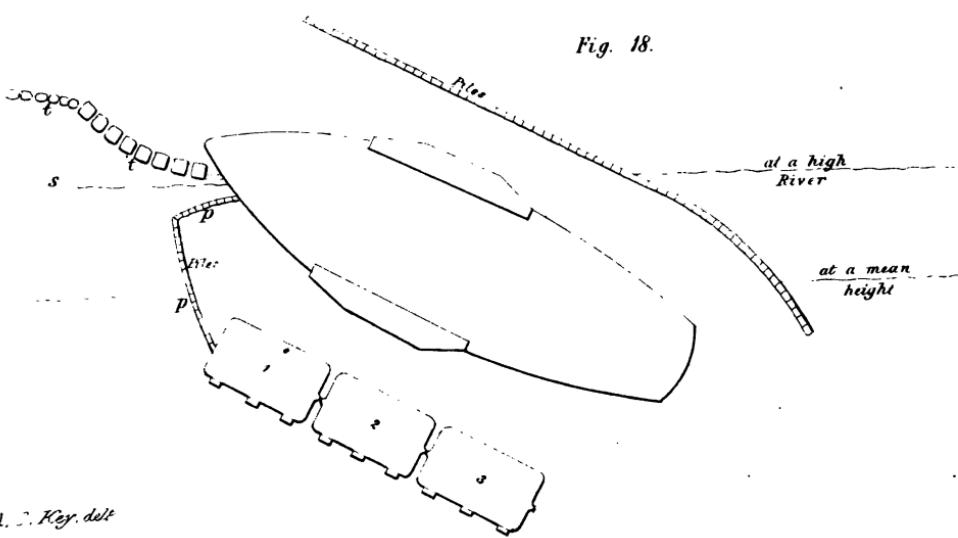


Fig. 18.



L. J. Key delta

London, Smith, Flavin & C. Gribble.



dock. Hence, notwithstanding our recent check and loss of time, no material had been thrown away, or useless expense incurred. We learned the necessity of driving the piles deeper, and in the course of a short time the side of the starboard dock was found sufficiently secure to support the bank, only requiring to be occasionally driven down, as the excavations under the ship's bottom proceeded, tending to undermine, from time to time, the bank. So, as good sometimes comes out of evil, we practically learned the principle whereon to construct a dock on the sheltered side from that which, at the moment, we considered the greatest possible disaster. The original idea, therefore, of placing the piles to prevent the ingress of the sand reflects very great credit on the clever designer, and proved of importance to the success of the undertaking.

It was a few days after this occurrence that the happy idea of a plan to supersede the coffer-dam presented itself to Captain Hotham, the details of which will now be explained :—

In prosperous commercial times, a company had been formed in Monte Video, for the purpose of clearing out and otherwise improving the harbour: to effect this, they procured from England a mud-clearing machine of the usual construction, to be worked by a steam engine; attached to the machine, were four large iron flat boats to receive the mud when hove up, fitted with a hopper or large hole

in the centre, through which the mud was afterwards started. Owing to the disturbed state of affairs and other circumstances, the machine was never set to work, the engine became neglected, and subsequently, during a heavy south-westerly gale, the iron boats were driven on shore in different spots at the head of the bay. One of them happened to be lying embedded in the sand about 250 yards from the *Gorgon*, the other three about one and a half mile distant, two to the westward, and one to the eastward. It was to these boats that Captain Hotham's attention was drawn; if any means could be devised to fix them in a proper position so as to form a breakwater, they might prove a substitute for a coffer-dam, at a comparatively trifling expense; for it had been ascertained that we might use these boats for any purpose, provided they were left in a similar state, as to repair, &c., as when borrowed. That near the ship, after a rigid examination, proved to be in so serviceable a state, that it was determined to keep her for another purpose, which will be hereafter explained; the remaining three being sufficient to form a breakwater 120 feet in length. The dimension of each boat was as follows:—thirty-six feet in length, fifteen feet broad, and four feet deep; in shape they were oblong; the corners being rounded, sides perpendicular, and flat-bottomed; a square iron keel was bolted on the centre of the bottom, and continued up forward.

and aft as a stem and sternpost; they were built of three-sixteenth inch iron, and weighed about four and a half tons.

An officer and a party of 100 men were sent for the purpose of launching these boats; the difficulty of performing this duty may be easily conceived. After clearing the sand from around them, they were raised by means of screws on ways of timber, and being swiftered with two turns of a 6-inch hawser, they were dragged to the water's edge, over rocks, stones, and other impediments, a distance of a quarter of a mile, by a three-fold purchase, brought to a stream anchor which had been laid out in the required position. The execution of this was somewhat impeded on the first day, by the unexpected arrival of an eighteen-pounder shot in the midst of the working party, followed by three more passing over their heads; these messengers had been sent from Rat Island, by the Monte Videan garrison, mistaking our party for a detachment of Oribe's army erecting a battery, and our union jack for a Buenos Ayrean ensign; on a boat being sent to the fort, the mistake was explained, and an apology offered and accepted.

When the iron boats were fairly in the water, twelve pipes were lashed to them, and the boats taking them in tow, they were brought down to the ship. At the expiration of a week from the commencement of the operation, the three lighters were securely fixed in the required position on the

port side, making, as I said before, a line of break-water 120 feet long, parallel to the keel, the inner edges being about twenty-four feet from the ship's side; they were secured thus—the foremost boat was hauled in on the beach till her stern was nearly abreast of the cathead, and after placing her in the proper position, that is, parallel to the ship, three piles of hard-wood, twenty-one feet long, were driven twelve feet into the sand, close to her outer gunwale, a chain cable was then passed round these piles, close down to the sand, under the boat's bilge, up through a hole in the bottom, round the keel, and again round the pile, three turns being taken alternately round each pile and the keel. An additional lashing of small chain was passed through holes in the boat's gunwale, and round the upper part of each pile. The stem of the second boat was then brought in immediate contact with the stern-post of the first, and holes being bored through each, they were securely fastened together by bolts passing through and through, and nuts screwed on on the inside; the third boat was placed in a similar manner, and both were secured like the first, to piles. As an additional obstruction to the entrance of sand between the boats, plates of iron, cut to the proper shape, were placed on each side of the stem and stern-post, and bolted together. When the iron boats were all secured, the dock was completed by a row of grooved piles being driven to connect the

headmost boat with the ship's side, commencing from the stem of the iron boat and forming an angle at the head of the dock, sloping in toward the ship's bow just abaft the cutwater, with a view to directing, as it were, the surf to the angle, and causing it to expend its force at the strongest point. In fig. (18) these piles are shown by *p p*, the iron boats fixed in their proper positions, by 1, 2, 3; *t t* are tanks and casks filled with sand, and placed to break the force of the surf, as a protection to the starboard dock; *s s*, the line of beach.

From this moment, our prospects brightened; no longer should we have to encounter such disheartening failures as heretofore, when the labour of a month had been annihilated in a night. Henceforward, the men worked with a conviction that every hour's work was one step towards their ultimate success, whereas previous to this, as has been before mentioned, they had entertained the idea that their labour was in vain.

It is universally known how much a man's physical endurance depends on the state of his mind; it may therefore be imagined with what increased energy and alacrity our men exerted themselves when once this conviction had taken hold on them. So with the understanding that two lighters are fitted with buckets and gear in the same manner as that working in the channel, we will, with the reader's permission,

allow the men to continue their work, by day and night, in these lighters—one in the channel astern, and one in each dock; whilst we return to recapitulate, and form a summary of the amount of force at present applied to the ship.

In estimating the power of any purchase, it is assumed always that a force is available sufficient to bring the greatest strain on the hauling part that the rope will bear. As in our case *that* force always *was* available, we will proceed on the assumption that the hauling part is brought to its extreme tension, and from that deduce the power of the purchase. The old rule for estimating the strength of a rope was, that  $\frac{c^2}{5}$  = number of tons the rope will bear without breaking, where  $c$  = the circumference of the rope in inches. This formula was established before the art of ropemaking had arrived at the comparative perfection at which it is at present, and therefore cannot now be applied with equal correctness. As no experiments have lately taken place for the purpose of establishing the true formula, it is necessary in this case to make use of an empiric law, founded on the observation and opinion of practical men; which therefore has been done. In a purchase, consisting of several parts, it has generally been assumed, that the strain on the first part multiplied by the number of parts will give the power of the purchase; this is evidently a fallacy; but as the law of decrease of strain on

each successive part has not been determined, it is, in the following summary, assumed to be a decrease of .07, or 7 per cent. of the strain on the part immediately preceding.

To commence with the viols—the largest consisted of two parts of  $17\frac{1}{2}$  inch, the first part rove through the block at the stern-post, as stated above, making an angle with the horizon, the sine of which, is = .25. Then, as the rope will bear a strain of 70 tons, resolving this vertically and horizontally, we find that 17 tons is available in the former direction, and 66 tons in the latter; this is for the first part; for the second or standing part, a reduction of one-fifth on the horizontal strain is allowed, as it passes round a sheave working under water, and is therefore liable to become corroded or choked. The standing part, therefore, exerts on the ship, a horizontal force of 54 tons, making a total for the large viol purchase of 121 tons horizontally, and 17 tons vertically. The smaller viol is of  $12\frac{1}{2}$  inch, and is not rove through a block at the stern-post; one part will bear a strain of 34 tons, making, then, the same reduction for the standing part as before, leaves a total horizontal force of 61 tons.

The shore purchases consisted of 7 parts of  $6\frac{1}{2}$  inch rope, applied in a direction making an angle of  $10^{\circ}$  with the keel. The hauling part being able to sustain a strain of 7 tons, allowing a reduction

of .07 on each successive part, we obtain a total force, exerted by each purchase in its own direction, of 85 tons; and, by multiplying this by the cos. of  $10^\circ$ , a horizontal force in the direction of the keel of 34 tons, or 68 tons for the two purchases.

The large screw, fixed under the cutwater, was placed at an angle of  $18^\circ$  to the vertical; the pitch of the screw was two inches; the centre of effort of the power described a circumference = 56.5 feet: the power of the screw was therefore = 339. The bars were worked by 12 men, and, supposing them each capable of exerting a force of 65 lbs. for a short time, it will give the pressure of the screw on the cutwater in its own direction = 118 tons; the friction of wrought iron on itself is = one-ninth of the pressure, making this deduction, leaves 105 tons as the correct amount of power exerted, which may be resolved into 98 tons in a vertical, and 32 tons in a horizontal, direction.

Of the smaller screws, whose power is all exerted at an angle of  $10^\circ$  with the horizon, two are of cast iron, and are larger than the rest; their pitch is one and a half inch, and they are worked by four men each; the bars eight feet long, calculating their power in the same manner as before; deducting one-seventh for friction, will show their power to be each = 43 tons. The remaining eleven small screws are of various dimen-

sions and power, their pitch being from one-half inch to three-fourths of an inch, the bars four feet in length, and worked by two men. Making the usual deduction for friction, the power the whole thirteen exerted, was equal to 265 tons horizontally, and 43 tons vertically.

The simplest method for ascertaining the upward pressure exerted by the immersion of the decked lighters, is to measure the area of a horizontal section at the light water line, and also at the under part of the deck. The volume expressed in cubic feet, contained between these two sections, divided by thirty-five (the number of cubic feet of water in a ton), will give the lifting power of each lighter in tons. By this it was found that one lighter exerted a vertical pressure of 28 tons, the other of 34 tons.

In addition to these, there still remains the two iron boilers and forty pipes lashed to the ship's bilge, deducting their weight from the weight of water they displace, both of which are easily found by calculation from their dimensions, will give their lifting power. The result is, that the two boilers exert a total pressure of  $9\frac{1}{2}$  tons, and the forty casks of 18 tons.

A summary may be more clearly shown in the form of the annexed table:—

Mechanical Means Applied.	Power exerted in Tons.	
	Horizontal.	Vertical.
Large viol purchase . . .	121	17
Small ditto, ditto . . .	61	..
Shore purchases . . . .	68	..
Large screw . . . .	32	98
Thirteen small screws . .	265	43
Two decked lighters . .	..	62
Two iron boilers . . . .	..	9½
Forty pipes . . . . .	..	18
	<hr/> 547	<hr/> 247½

It must not be supposed that, in the above recapitulation, any attempt has been made to show that an excess was obtained, in the force exerted, over the resistance to be overcome; as that is a point which even the most subtle investigation would fail in producing anything like a correct result. Were the object required, merely to ascertain the power necessary to lift the ship and engines, a comparison between the resistance and the force applied might be made, which could be relied on as correct to a pound. But where, as in our case, the resistance is occasioned, first, by the force opposed by the sand against the stern-post; secondly, by the friction of the keel and part of the ship's bottom in contact with the sand, both of which impediments depend on the weight of the ship, which itself, even when *correctly* calculated, is modified in a very great degree by the slightest difference in the depth of water, a point always difficult to ascertain within some inches, it may

easily be understood that, as the law of the friction of bodies in sand is so little known, any attempt to calculate the amount of resistance to be overcome, would be a useless expenditure of time and patience. The summary of the mechanical force applied, has been given merely to show more clearly, on what scale our work was conducted, and also what an amount of power may be derived from the proper application of comparatively small means.

The ship had been upwards of two months on shore: all the plans detailed above had been completed, and others not yet described were in progress, when an event occurred which certainly forms the most important era in the narrative. It was the first movement of the ship !

On the 14th July, a south-westerly breeze which sprang up in the morning brought a gradual increase of water into the bay. The evening of the 15th, at 8 A.M., found us with the water up to the eleven-feet mark on the stern-post, and the ship shaking with every wash of the surf. It has before been mentioned, that Captain Hotham had determined not to risk anything by a premature trial; it was hard, however, to withstand the importuning looks and expressions of impatience from all around him. He, therefore, more to please the men, than from any expectation of success, gave the orders to get the steam up in two boilers, and, when up, to man the capstans and screws.

On heaving taut of all together, to the surprise and delight of everybody, the ship's bow was raised by the large screw under the cutwater ; a few inches only, it is true, but it was sufficient ; the ship had moved ! she was not now the same inert mass of matter that she had appeared to the men for the last two months. The effect on them might be compared to the joy occasioned on hearing the first sigh escape from the lips of an apparently drowned man. She had life, and "while there is life, there is hope." The movement in itself was unimportant ; it was occasioned by our excavations having latterly been principally directed to the after-part of the ship, under the quarters. The ship, therefore, resting on a bank in midships, immediately beneath the engines, a comparatively small power would be requisite to move either extremity. It is not to be wondered at, then, that a pressure of 100 tons should do so ; to a reasoning man, therefore, no actual advantage resulted from the mere change of position of the ship, nor could a more satisfactory influence be drawn than heretofore ; but 'Jack' does not reason, he sees the effect, *that* is sufficient for him. The ship had moved once, and of course she can be got off. The *result* was clear to everybody. The men worked with a more hearty goodwill, if possible, than ever.

The tide had, at the instant of heaving, been up to eleven feet six inches, but had receded imme-

diately. When all was hove taut, the engines were stopped, the fires put out, and the usual day's work proceeded with. On the cessation of the gale, during which the surf had been unusually heavy, it was gratifying to find that no damage had been done to our dock on either side, the iron lighters on the port side had answered their intended purpose admirably; they had not started, or admitted any sand; not a pile had been loosened; and the channel astern remained as before the gale, with the exception of in one or two places it had been filled up to the depth of six or eight inches.

It is now time to explain the purpose for which the fourth iron lighter was destined, and the preparations which had been made to equip her. It has before been stated, that on examination it proved to be in a more perfect state of repair than the others, and in fact, on close inspection it was found that with a little care, and engineering skill in strengthening her, she might be made available as a powerful "caisson" to be fixed at the ship's stern, to assist in lightening the ship's draught; this was the purpose for which she was intended, and the following is the method of putting it in execution. Every plate and rivet was rigidly examined; where much worn, the plate was taken out and replaced by a new one; the rivets were all more firmly clinched; the sides supported by iron stays; the hole for the "hopper" was filled

up with plates of iron, and a notch was cut (as shown in the fig.) five feet deep to receive the stern-post, the inside of the "notch" being filled round with iron plates and securely stayed as the rest; when the iron work was completed, well-shored beams were placed athwart, and then the deck over all, well caulked and payed; a scuttle being left for access to the interior, and two holes for pumps; a cock was also fitted in the bottom, which could be turned by means of a rod leading up on the deck. When fully prepared and having been previously filled with water to ascertain that no leak existed, the "caisson" was launched, and brought to the ship's stern to be secured. Water was again let into her by means of the cock, till she was sunk to such a depth as to be easily manageable, and she was then shored, and lashed in the manner represented by fig. (19).

*A* is the cavity or notch cut in the "caisson" for the reception of the stern-post.

*B B B B* are four pendants of  $6\frac{1}{2}$  inch rope rove with a running eye round the "caisson," and set up with tackles abaft the paddle-boxes on each side. These prevent motion in a fore-and-aft direction.

*C C* are pendants set up with lanyards to a gudgeon on the stern-post.

*D D*, tackles hooked to strops on each stem, and to bolts in ship's side.

*E E*, places for stepping the shores.

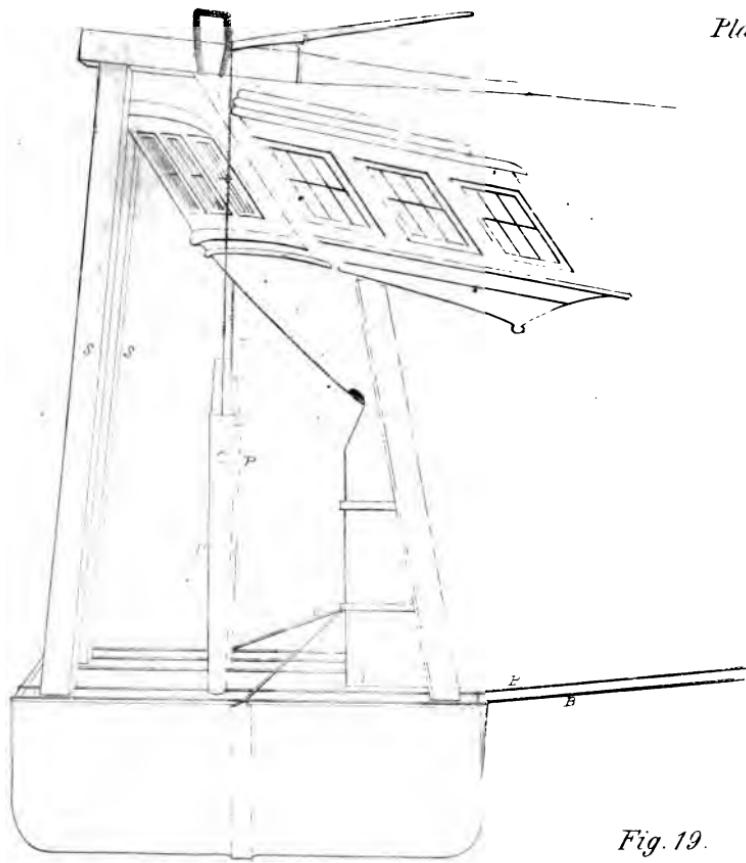
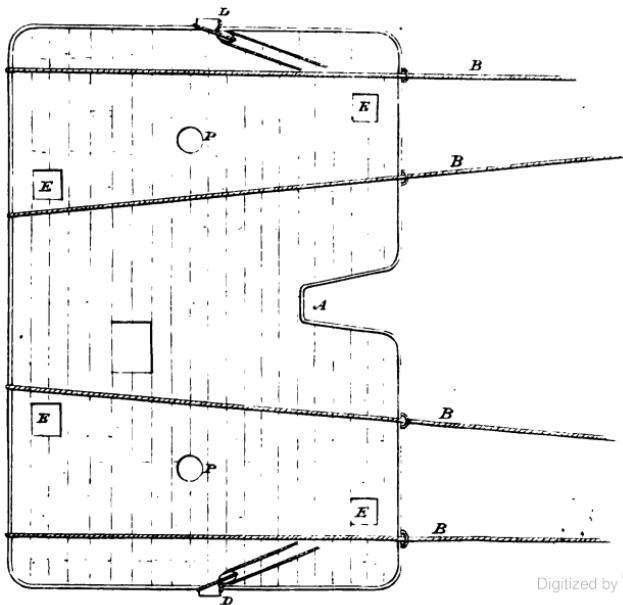


Fig. 19.





*S S* are four shores, forming the vertical support of the “caisson.” The two foremost have their heads bearing under the ship’s counter, and are there cleated; they slightly incline aft. The after shores bear against balks of timber, projecting over the taffrail, which are firmly secured in-board, by lashings passing round them, to bolts in the deck, driven through and clinched. These shores slightly incline forward.

*P P*, the pumps, the spears being long enough to be worked from the taffrail.

When the “caisson” was pumped out dry, she of course took a firm bearing against the shores, and her upper edge was on a level with the 9 feet 6 inch mark on the stern-post.

The dimensions of this vessel have been given before; being of  $\frac{3}{5}$  iron, her weight was about 4½ tons, and including the deck, beams, shores, &c., may be called 5 tons. Her displacement being equal to 62 tons, will leave, as her lifting power, when totally immersed, a pressure equal to 57 tons. When the “caisson” was first fixed in its position, there were very few on board who expected to see it successfully resist the violence of the surf; but a heavy south-west gale, which occurred soon after, proved to all its capability of doing so; in fact, the immense upward pressure with which it bore against the four points of support, was of itself sufficient to render futile all attempts to displace it. Another circumstance also tended to

its security, at a high tide, which always accompanied a southerly gale, and therefore in the heaviest surf, the water would be a foot and a half, at least, above the deck of the "caisson;" the force of the surf consequently was expended over it, rather than against the sides.

Secured in the manner described, the "caisson" withstood numerous heavy gales during three months, and shewed no symptoms of insecurity till the ship was hove into the mud. Of all the agents employed, this proved the most trusty and faithful. Easy as it may appear to the professional man to place such a "caisson," and secure it across a ship's stern, to withstand a heavy surf, he may be assured that no small share of care, judgment, and forethought is required; the position of the four shores, the foremost sloping aft, the after ones sloping forward, so that their strength was employed to sustain the exact vertical pressure of the "caisson," and thereby resist any tendency to move in a fore and aft direction, which a different arrangement would not have done: the attention required to the caulking, and examination of the rivets, the numerous shores under the deck, and exact bearing of each, the securing of the outriggers from the stern, for the after shores to butt against—all these give ample employment for science and practical skill, and room for no small anxiety as to the result; and, when com-

pleted and pumped out dry, it may be easily conceived that the designer will feel much satisfaction at seeing the "caisson" exerting her full lifting power, and shores, outriggers, and lashings bearing their relative strain in just proportion.

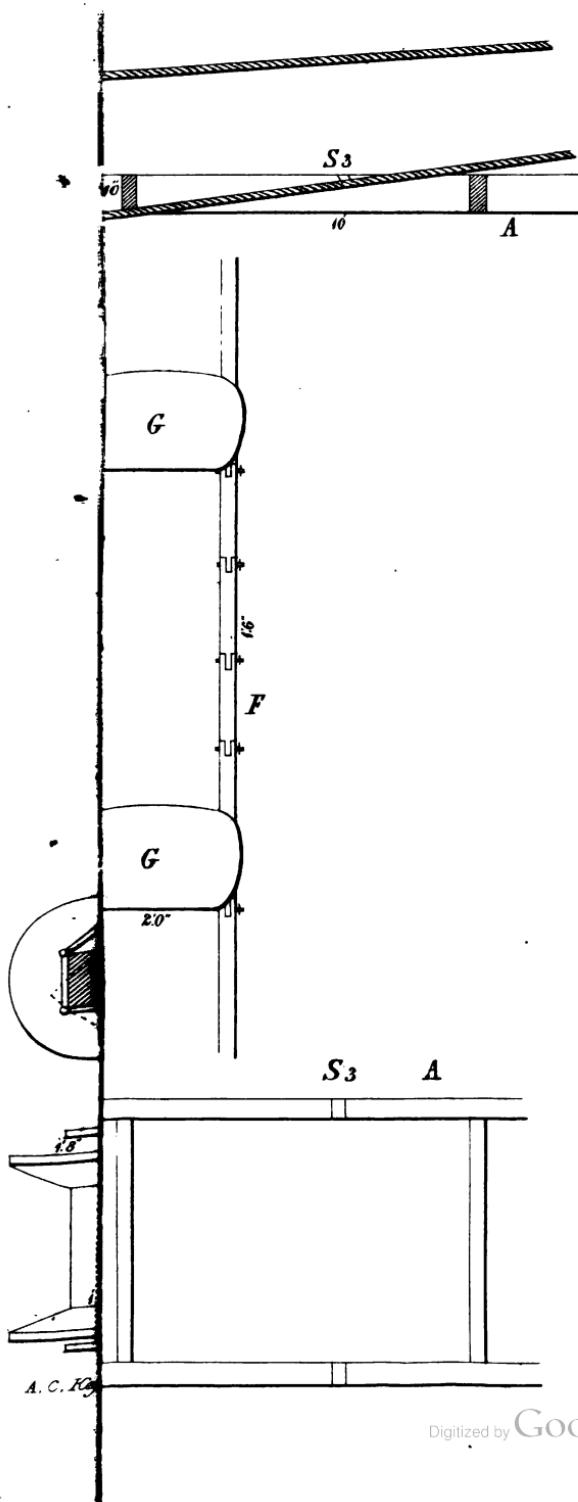
The experience of the 15th of July shewed us, that when the strain was brought on the main viol purchases, the irregular and quick action of the engine tried them severely, as runners; but by applying a three-fold purchase to the runners, this might be avoided, as the strain being then divided among so many parts, a sudden jerk would not be so liable to carry it away. This was accordingly done; on the starboard side, one purchase consisted of a three and four-fold 22-inch block, the latter being lashed to the runner (which was brought in over the taffrail, instead of being rove through a block at the stern-post, as before), and the three-fold block taken close forward to a bollard on the forecastle, the lashing passing over the bilboard in through the foremost main-deck port, and round a balk of timber, which was placed in-board as a toggle. The fall was 8-inch, and was brought to the paddle-shaft as before. Another three-fold purchase was clapped on the starboard runner, the fall being brought to the upper-deck capstan. On the port side the purchase was three-fold, and the fall 8-inch. The blocks were lashed,

as on the starboard side, and the fall taken to the port paddle-shaft.

The mud machines had been working without intermission, one on each side of the dock, and one in the channel astern, with perfect success; the ship was cleared of sand fore and aft to within about three feet of her keel; the channel was very fairly completed for a cable's length; and, in fact, all our arrangements bore such a favourable aspect as increased the hopes of the sanguine, and tended to convince the more sceptical, that the next high tide would inevitably restore the *Gorgon*, not only to her "native element," but to her original anchorage in the roads. A southerly gale was now anxiously looked for; and, indeed, it was of importance that a fair trial should put the means then employed to the test; not that invention was exhausted—far from it; Captain Hotham had yet numerous untried plans ready to be put in operation, the instant it was clearly proved that those already completed were insufficient; but it was advisable that this *should* be first proved, as every fresh device necessarily involved additional expense, and the rigid economy which had hitherto controlled our operations, demanded that no farther expense should be incurred, until the failure of the plans already completed, rendered it requisite, especially as all who were competent to judge, concurred in the opinion, that nothing was now wanting but a moderately high tide to ensure success.

Increased exertions were directed to the proper clearance of the channel astern. Since its commencement no cessation had taken place, except during the few hours that the surf on the beach might prove too much for the boats to take off the working parties; and abundant evidence had been afforded, that little or no damage ever ensued during the occasional gales, and therefore the channel was in a fair state of completion. It had been commenced close to the stern-post, dug to a level with the after part of the ship's keel; from thence, continued in the direction of the heaving-off cables at the same depth; the excavations in the dock proceeded as before; the machine in the starboard dock, being protected by the ship from the swell, could with safety and ease work at all times and during any weather. That on the port side, however, was more exposed; a very slight swell was sufficient to prevent the works being conducted on that side with the usual rapidity: a plan was, therefore, devised to supersede the use of the lighter, in case a continuance of bad weather should prevent its being employed with any advantage. The plan was this:—A framework of wood, constructed in the manner represented in fig. (20) by A A, was secured to the ship's port side, just below the level of the upper deck; it was fifty-four feet in length, the after end being a few feet abaft the gangway. In each division of this frame scores are cut to receive

the axle *c*, which is the centre of the roller *B*; this roller is left circular at each end, but the rest is squared and faced with iron, the sides being eighteen inches in breadth. One of the circular ends, *a a*, is scored to receive a strap. To the axles of this roller another frame, *D D*, is attached by means of two holes lined with iron in the upper extremity of each side, through which each end of the axle passes, and is free to revolve. This frame is twenty-four feet in length; at its lower end another roller similar to the first revolves; round these two rollers is passed a double chain, *F F*, consisting of links of the same length as each side of the squares; it is supported on the upper side of the frame by the small rollers *E E*; at every fifth link an iron bucket, *G*, is attached. To cause this machine to revolve, a strap is passed round the score *a a* in the upper roller, and then round the paddle shaft; by this means it may be worked by the engine. The lower end of the frame *D* rests on the ground, and each bucket, as it passes up and over the upper roller, empties itself on a platform fixed for the purpose, from whence the sand is then conveyed across the deck, and discharged down an inclined plane on the opposite side to the beach. When sufficient has been excavated from one spot, the frame *D* may be transferred to another score *S<sup>o</sup>*, and the strap being shortened, the machine may be set to work as before. By this means the excavations might be continued under





any circumstances. It was never, however, put in practice ; the whole was completed, the frame fixed up, and it could have been brought into use at any time if required ; but a duration of fine, calm weather enabling the mud-lighter to continue at work, rendered it unnecessary, and of course all additional weight was prejudicial.

From some of our scientific visitors, and others interested in the success of our operations, this plan met great approbation ; and surely some credit may be claimed for the novelty of the idea of making, as it were, a steamer dig herself afloat by her own mechanical resources.

The month of August was passing rapidly by, and still there was no appearance of the south-westerly gale, and accompanying high tide, that had been foretold as certain to take place, by those whose experience in the river rendered them competent to give an opinion ; but, though every indication of a change of weather was carefully watched, and many an anxious eye cast on the barometer, no cessation of labour could yet be allowed. In addition to the working of the mud-lighters, each day brought forth its own employment. Did a lower tide than usual occur, every shovel was put in requisition, generally to the number of about one hundred, to clear out the sand round the bows and quarters, and close in to the piles where the lighters could not approach. Another party, with the pile driver, would daily inspect the piles, driv-

ing them deeper where the sand had been undermined from them, or drawing them and driving new ones where they required it. Then the foundations of the screws would require additional support; in fact, not a day passed that did not disclose some fresh instance of the treacherous nature of our old enemy, the sand; and it may safely be asserted that there never was an enemy more closely watched, or whose inroads were more carefully guarded against.

It was at this stage of our proceedings that an incident occurred, which tended to relieve our minds from that state of oppression, usually obtained by dwelling too long on one subject, and, perhaps by varying the monotonous course of dry details, the relation of it may have the same effect on the reader.

At about eight o'clock one forenoon, a whale-boat with Buenos Ayrean colours flying, containing ten men, was observed pulling towards the *Gorgon*, from the direction of the shipping in the roads, closely pursued by two Monte Videan row-boats. Their relative situation was soon evident; the whale-boat appeared to have ventured too far up the bay, and two boats had been despatched from the town to intercept her, on her return to the blockading squadron; the crew of the whale-boat, seeing their desperate situation, intended as a last resource to land on the ground we occupied, and claim protection from us, as neutrals. Pro-

tection was of course given to them, when they landed, and to show the Monte Videans what course we intended to pursue, the marines were ordered under arms. The Monte Videan boats approached to within a cable's length of the shore, and then lay on their oars. Captain Hotham went to them in his gig, told them of his determination to protect the crew of the whale-boat, and requested that no act of hostility towards that crew would take place. In the mean time, a colonel of Oribe's army, with a detachment of soldiers, had arrived on the beach, and showed great anxiety to commence firing on the Monte Videan boats; this, however, was not allowed, as Captain Hotham, on landing, acquainted the colonel with the communication just made to the other party. At this the colonel was very wroth, and under the influence of his passion, rode into the water towards the boats, and endeavoured, with much gesture, and no little eloquence, though in language not fitted for ears polite, to persuade the Monte Videans to pull farther along the beach, clear of the *Gorgon*, and then fight him; they, however, merely acknowledged his civility in like terms, but declined his offer. The tide was low, and the colonel in his excitement had ventured some distance from the shore, a few feet further and the gallant dragoon would have served our purpose, by giving a practical demonstration of the depth of the '*Gorgon* channel,' an event we were

all anxiously looking for, but as the boats did not appear to enter into the colonel's views, he retired from the scene without the wished-for "finale" taking place. At the first discovery of the chase from the town, two gun-boats had been despatched for the protection of the pursuers should they require it; these gun-boats now arrived and anchored close to the other boats, apparently with the intention of intercepting the whale-boat, should she attempt to escape; they cleared their guns for action and the crew then retired below to take their "siesta." The party on shore now brought down a bullock-cart, into which they put the whale-boat, with the masts, sails, and oars, and drove off with it inland. Their next step was, to disturb the repose of the gunboats' crews, by opening fire on them from two field-pieces, which they had very rapidly transported from their nearest outposts to a sheltered spot on the bank, about half a mile to the eastward of the *Gorgon*. The first shot passed between the masts of the headmost boat; they both immediately weighed, and under easy sail, stood across the fire of the battery; a smart action now commenced, much, however, to the disadvantage of the boats, they offered so fair a mark for the really well-directed shot from the battery; whereas, in return, they had no object at which to direct their fire, but the crews of the field-pieces, who could retire under cover of the rising ground, when they had occa-

sion. The gun-boats, however, were not hulled, a few shot passed through their sails, and the commander of one boat had his arm shot off; perceiving their disadvantages, they soon bore up, and under easy sail, stood over towards their anchorage. The reader may smile, perhaps, and imagine, that too much notice has been taken of a trivial subject, but it was beyond doubt, that events such as these served, in a great measure, to keep up that spirited tone so remarkable amongst the men, and which could not have existed for so long a period without some such artificial stimulus.

On the evening of the 17th August, the tide commenced gradually to rise without any apparent cause, it being perfectly calm; by midnight the water was up to the eleven-feet mark; the steam was got up in the starboard boilers, and at 2 A.M. the hands were turned up to man the purchases and screws. It was still calm—the shore purchases were first hove taut, and then all the screws hove on together; to our surprise and gratification the ship commenced to move astern—the engine was put in motion, and as the strain came on the main purchases, the ship again moved some inches; by watching carefully the motion of the horizontal screws, the least movement of the ship could be detected, every inch was immediately reported to those on the forecastle, causing the men at the capstans and screws to redouble their exertions;

to all it appeared that the happy moment of release had at last arrived. Many a sanguine heart beat high with hope that night, expecting that another hour would bring the reward of three months' labour. But, alas ! they were deceived, no sooner had the strain been fairly brought on the main purchases by the engine, than the starboard fall carried away, and whilst splicing it, the tide fell to ten feet two inches, putting an end to any further attempt that night. At daylight, we found that the ship had been moved astern seven inches, and her quarter slightly hove out to seaward. Altogether, the morning trial was regarded as satisfactory, the tide at no time rose to within a foot of the height we had a right to expect ; and the ship certainly continued to move until the strain was taken off her, by the purchase-fall carrying away.

But days and weeks were rapidly passing, and we began to fear that our expected twelve-feet tide would never appear,—a new power must, therefore, be called into action. Captain Hotham resolved to extend the lifting power, so successfully applied in the case of the stern “caisson,” by the construction of camels to be secured to the ship's bilge.

The idea of constructing these machines was borrowed from the Dutch, who first brought them into use to transport ships across the Pampus—the same method was, I believe, practised by the



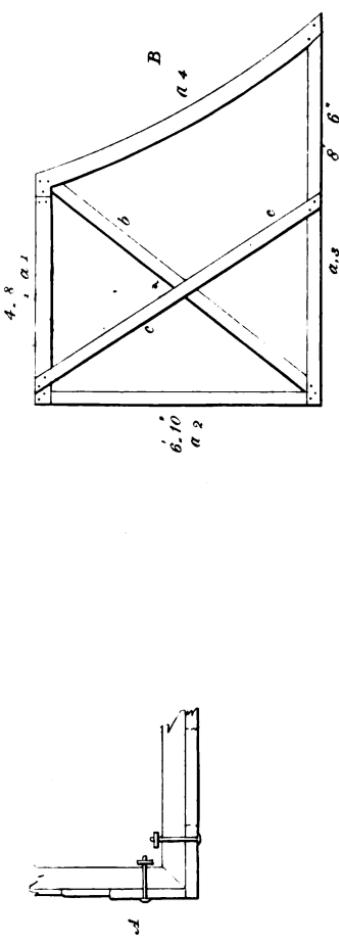
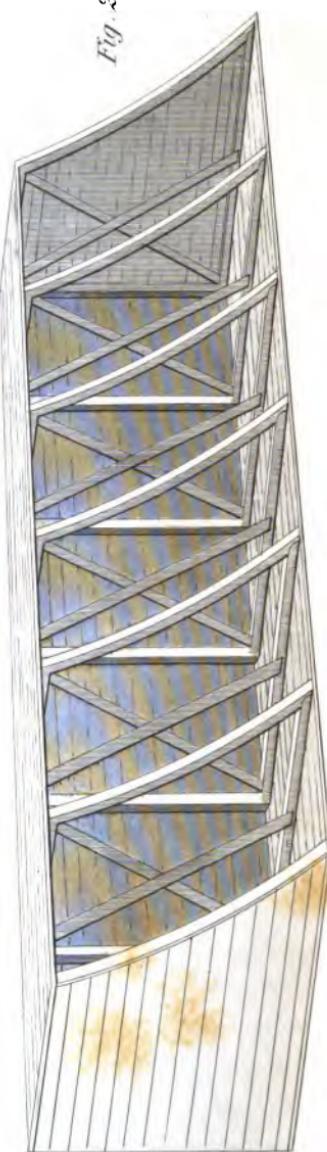


Fig. 21.



Russians to convey their ships of war from St. Petersburg to Cronstadt, after they were built; and it was very evident that the plan of applying the same means to lighten the draught of the *Gorgon*, was feasible.

The construction of the first was instantly commenced—a glance at fig. (21) will be sufficient to explain the method; the camel is there represented with the side next to the ship's bottom displaced, for the purpose of showing the interior. The planking of the top, bottom, and ends is of three-inch fir; that of the front and back of two-inch, with the exception of the upper and lower planks, which are three-inch. The interior frames, (B, fig. 21) of which there are seven, are made of American pitch-pine; *a a a a*, forming the four sides, are 9 inches by 5; all of them except the latter are placed on their flats; *b, c*, are shores four inches square, to support the frame.

The length of the first camel was 39 feet, the other dimensions are given in the fig. The frames being placed at equal distances, the plank is nailed to them with seven-inch nails, the two planks at each edge are in addition bolted together with screw-bolts, shown by *A*, as it was soon found by experience that *there* was the weakest part; when completed, every seam is caulked and payed with the *greatest* care; a defect in this particular might render the camel inefficient at the time of greatest need.

The power of one of these machines is easily ascertained by deducting its own weight from the weight of water it displaces.

At the time this camel was being made, a more economical application of the same power was devised, and put in execution. Eight iron two-ton tanks were securely bound together by iron rods, in one tier of two rows, four in each; the lids being screwed in, and made water-tight by introducing strips of farnought, well covered with red lead. These were secured under the starboard bow, to the swifter, and supported by shores, the heels of which were stepped on the tanks, their heads bearing against cleats on the ship's bow; advantage being taken of a low tide to place them in the required position.

Before the camel could be completed, and placed as intended, another opportunity occurred to put our plans and preparations to the test. On the morning of the 22nd of August, a breeze sprang up from the S. E. which, gradually freshening into a gale, brought the usual rise of water into the bay. The steam was got up, the capstans manned, the purchases and screws hove upon, and the engine put in motion. The water was then up to the 11-feet mark. The ship commenced moving astern very slowly; the tide was rising, the engine was working remarkably well, and the cables coming in steadily over the stern, but still the ship moved but by inches. Fears began to

be entertained that the anchors were coming home, when, the ship having been dragged astern 2 feet, the water being nearly up to the 12-feet mark, the port purchase-fall was carried away. While splicing this, the water commenced falling, and the hands were therefore piped down. We also had the mortification to see a very heavy surf setting into the dock, breaking down the piles, washing in the sand, and committing ravages, which we knew would take us some weeks' hard labour to repair. This day's experience was bitter; it shewed clearly that the present means adopted, were inadequate to the accomplishment of the undertaking. The camels were our only resource; our confidence in them was increased by the undoubted success of the iron "caisson;" but other alterations were rendered necessary. The ship was now heeling over 7° to port; and, having moved astern two feet, the large screw that was applied to the cutwater, was no longer of service. It was therefore removed, and afterwards applied as a pushing power, in the same direction as the smaller ones, and in a manner which will hereafter be described.

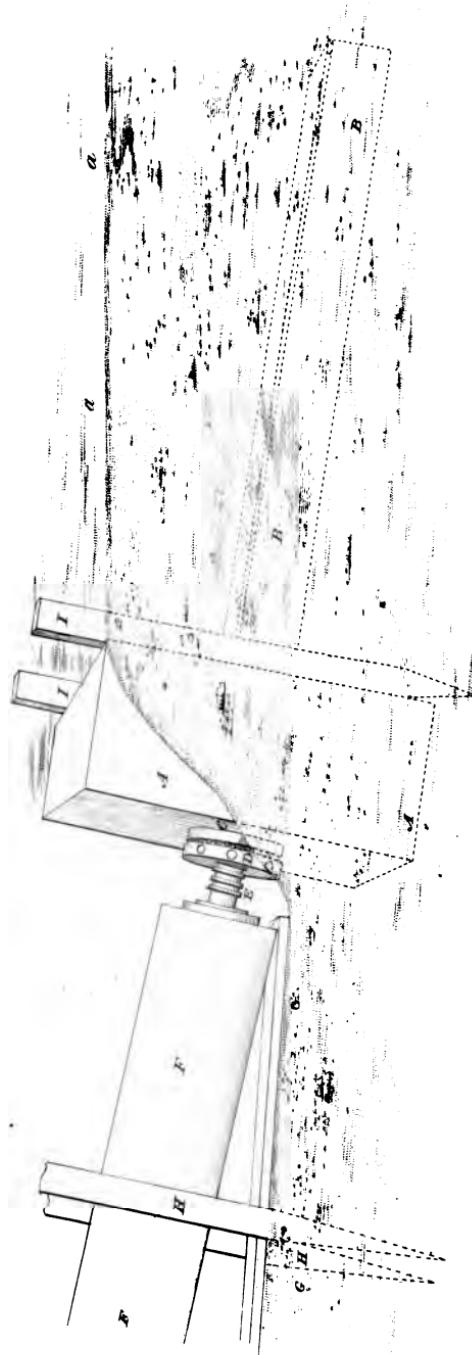
The removal of this screw enabled us to complete the piles entirely round ahead of the ship, joining the port and starboard docks; the sand could then be excavated immediately in the vicinity of the cut-water. The shore purchases were also

removed, as they had dragged the spare machinery out of the sand. The damage caused by the surf was found not to be so great as we expected ; the channel astern had not suffered ; and a few days' labour removed the sand that had been washed into the dock.

About a fortnight before the above trial took place, her Majesty's ship *Satellite* had arrived from Rio, having on board a seventy-two cwt. anchor for the *Gorgon's* use, if it was required. Up to this time it was of no service to us, as no cables of sufficient size could be procured ; but at the last "heave" so much slack of the cables had been hove in, that by cutting them close to the taffrail, and splicing the pieces together, they formed a cable of 130 feet in length. The anchor from the *Satellite* was now laid out south-east by south, or nearly astern, with this cable bent to it, and brought in over the port quarter. The purchase to be clapped on this, was rove with seven and a half inch breeching rope, supplied to us by the *Curaçoa*. At the same time we most fortuitously received three eight-inch shroud-hawsers from the *Satellite*, *Philomel*, and *Frolic*. These could form such an excellent purchase fall, that it decided Captain Hotham on a point on which he was wavering, viz., giving up the use of the engine, not from any fault in the working of the machinery, but the purchase falls in use hitherto, had been so much worn, that they could not stand the sudden strain that was



Fig. 29.



A. C. Key del'd.

J. E. Wood, sc.

brought on them, when the engine was put in motion. The well-timed arrival of the shroud hawsers removed this difficulty; they were rove as the large purchases, and the falls brought to the paddle-shafts as before. One of the shore capstans was brought on board, and fixed on the forecastle to work the purchase on this new cable.

The carpenters in the mean time had been re-fixing the large screw, which was intended, as before mentioned, to act horizontally: it was placed as shown in fig. (22). *A* is a block of oak, 7 feet by 4 feet, and 3 feet thick, having a circular hole in the centre to receive the socket *C*, which is a hollow iron cylinder, the aperture being large enough to allow the screw to pass through: this socket is screwed into *A*. The screw itself, *E*, is passed through this cylinder, the end projecting behind *A*, where it is encased in the box *B*, to preserve it from the sand; *D* the socket, in which the female screw is formed, is screwed down close to *C*, against which it works, shot being placed between them, in grooves for the purpose, to diminish the friction. In this socket are holes to receive the iron levers, by which means the power is communicated to the screw. *F* is the heel of the spar bearing against the screw, the other end bearing on the cutwater.

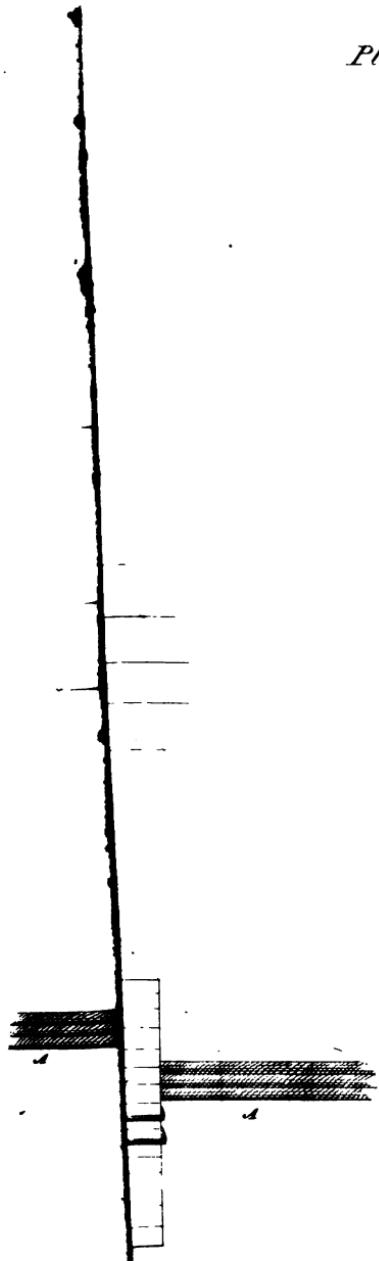
*HH* are piles driven on each side, to keep the spar steady.

*G* is a plank, on which the heel of the spar travels, always parallel to the direction of the screw.

*II* are piles to give additional support to the foundation : *aa* is the level of the sand.

The placing and securing the first camel is the next subject to notice. Fig. (23) represents the camel when lashed and shored. *A* is the  $12\frac{1}{2}$  inch swifter, three turns of which had been passed round the ship, and hove taut, as mentioned in the former part of this narrative. To this swifter, at the spot where the foremost end of the camel is intended to be placed, the standing part of a 6-inch hawser, *aa*, is made fast; then rove through a block on the swifter, 40 feet farther aft, brought back, and rove through another block, close to the standing part, the end then taken up on deck: this hawser is overhauled, and triced up to the ship's side. The ends of three 5-inch hawsers, *cc*, are secured to the swifter, at equal distances between the blocks, then rove through bolts *dd* in the ship's side, and passed on deck; they are then overhauled sufficient to allow the camel to pass through them, as shown in the plate. The camel is then brought into the dock, passed through the gripes *cc*; the hawser *a* is lowered and passed round her; the end on deck being brought to the capstan, and hove steadily taut. Water is then admitted into the camel by means of a plug, immersing her to the required depth. The gripes

*Plate XVI.*



*A. C. Key*

*J. E. Wood sc.*



are hove taut by tackles on them; when the hawser, *a*, and the gripes are well taut, the shores *ss* are placed, and the camel is then pumped out; as she rises, the inner edge takes against the cleats *ee*. When the strain is brought on the shores, great care is requisite in observing that they bear an equal strain, and that the heels have a firm step. The same plan was adopted in placing and securing the remainder of the camels, and the experience of a month did not suggest any improvement. As might be expected, leaks, occasioned by careless caulking and other defects, were not unfrequent. The most expeditious mode of repairing them, was to fill the camel with water, cast off the gripes and hawser, pass a round turn with a hawser, near each end, as parbuckles, both ends being worked on deck. A few hands on each parbuckle could then easily turn the camel over, bringing any side uppermost that required to be repaired. This was found to be far preferable to hauling the camel on shore, which not only occupied much time, but strained the seams considerably.

The advantage of the camel in reducing the draught of water, especially in a case like the present, is so obvious, that the inquiry would naturally suggest itself, why were they not earlier thought of, and brought into use? This is easily answered; in the first place, economy required that the means which were considered adequate, should

be *proved* not to be so, before others were resorted to, and secondly, the excavations in the dock were only *now* sufficiently advanced to admit them.

No cessation was yet allowed in the labour of the mud machines; they continued working day and night, one astern and one in each dock as before.

In the first week in September, another camel was built and placed under the port paddle-box. The length was 38 ft. 6 in.; height, 7 ft. 4 in.; breadth at the top, 5 ft. 10 in.; at the bottom, 10 ft. 4 in.; exerting therefore a power of 62 tons.

On the 16th September, at about mid-day, a sudden squall from the southward caused the water to rush into the bay with such force as to raise it 3 ft. in a few minutes, bringing it therefore on a level with the top of the camels; the ship, it must be remembered, was listing over to port  $7^{\circ}$ , and the shores of the lighters under the starboard quarter, had been lengthened 18 inches. When the camels were totally immersed, and were exerting their whole power, they had the immediate effect of bringing the ship upright, thereby forcing the keel of the foremost lighter on the opposite side, against the sand; her beams having then to bear the additional pressure of the opposing force of the camels, gave way, the shores went through the lighter's bottom, and she was then completely disabled. It was now necessary to

hoist her out of the dock, over the piles, as the "caisson" across the ship's stern, and the after lighter under the starboard quarter occupied too much space to allow room for the lighter to be *hauled out* of the dock between them and the piles. The disabled lighter was slung by hawsers passed around her, and by means of two threefold purchases over the paddle-box, she was hoisted out of the water; a stout hawser was then secured to her, and being manned by all hands, she was dragged over the piles. When clear of them, the order was given to take a turn with the hawser, the slack of which had been taken in round the only remaining shore capstan; the hawser was made fast round the capstan, and the bars unshipped, when, unfortunately, as two men were taking out the last bar, the pauls capsized, and the capstan swinging round, struck the bar against the heads of both men, fracturing their skulls and killing them on the spot; poor fellows, they were both fine young men, and good seamen; their bodies were taken over to the town and interred at the English burial-ground the next day; this melancholy event was the only accident that occurred during the five months the ship was on shore.

The lighter was found so materially damaged, as to be perfectly unfit for her former service; and as it had been shown, that an equality of lifting power on each side was requisite, two more camels were soon in course of construction, to be placed

on the starboard side, in positions corresponding to those on the port side: the foremost one to be 39 ft. in length; the other 30 ft.; their section not materially differing from the last. These two camels were built, caulked, and secured in six days; the cost of each being the trifling sum of 44*l.*

When these camels were placed, the lifting power applied to the ship was distributed thus:—

Port side.	Ton s.	Starboard side.	Tons.
Camel (1) . . . . .	56	Camel (3) . . . . .	64
,, (2) . . . . .	63	,, (4) . . . . .	49
43 Pipes . . . . .	21	Lighter . . . . .	28
2 Boilers . . . . .	10	Tanks . . . . .	14
	—	10 Pipes . . . . .	5
	150		160
Tons.			
Port side . . . . .		150	
Starboard side . . . . .		160	
Astern . . . . .		57	
	—		
Total . . .	367		

On the 23rd of September, a heavy gale from the northward caused the river to fall in a most extraordinary degree. The line of the beach, that is, the water's edge, would have passed 20 yards astern of the ship, had it not been for our dock and channel; in the dock there was still five feet water at the stern post. This shewed the difference between the extremes of the high and low river, which was, according to our experience,

7 feet,—12 feet having been the highest, and 5 feet the lowest, that our standard had shown. On the evening of the same day, the gale concluded with violent thunder and lightning, accompanied by heavy torrents of rain; the quantity of rain that fell during that night was so great, that it came pouring down from the country in *rivers*, carrying everything before it, and threatening to overwhelm us, by forcing down our banks of sand, piles, and all else, into the dock. To prevent this, we cut channels, to draw the water off into the river, ahead and astern of the ship; but, notwithstanding this precaution, many of the piles were forced down, carrying with them large bodies of sand, both into the dock and the channel astern. Two days' labour repaired these damages; and, by the morning of the 26th September, we were as prepared as ever. Fortunate was it for us that we were so. On the forenoon of that day, the water rose to 16 ft. 8 in.; the steam was got up, and all the purchases hove on, making, however, no impression on the ship, beyond moving her about two inches astern. At 1 P.M. this was repeated with the same success as before. At 4 P.M., the water falling, and the breeze dying away, it appeared that our chance of moving the ship that day was gone; however, at 8 P.M., the water again rose to 11 feet; the hands were turned up, and the purchases hove on; the ship soon commenced to move freely. Unfortunately

the iron runner block, on the port cable, was carried away; no time was lost in launching a boat, and sending another block to be lashed in its place. Meanwhile, the capstans and screws were hove upon, and the ship still continued to move slowly astern, the water then up to 11 ft. 4 in. At 11 P.M. the ship left the screws completely, the spars that rested against the bows falling down in the dock. This induced the seamen to work with increased vigour; their exertions now were truly surprising; without relaxation, or a moment's intermission, they continued to use their utmost strength for a space of seven hours and a half. At 2 A.M., the runner block being lashed, the purchase was again clapped on the port runner, and the fall taken to the main-deck capstan. The ship continued to move steadily astern till 3h. 20m. A.M., when the water fell to 10 feet. The hands were then piped down, having transported the ship 15 feet. Certainly our best night's work for some months.

The joy depicted in the countenances of all the next morning can be easily conceived. Who could now express a doubt of success? Our feelings, indeed, were enviable, when, after daybreak, we surveyed the result of our labours.

The ship had been moved directly *astern*, owing to the disuse of the first purchase for a considerable time while the runner block was being relashed, the strain therefore having been principally

on the starboard cable which was more nearly in a line with the keel. The screws could now be of no farther service, they were therefore removed and returned to the owners, who had the satisfaction of knowing that their screws had done their duty well: for without doubt it was by their power alone that the ship had been started from her original bed, which was the end for which they were applied, and for which purpose no power could have been better adapted.

Before we entirely quit the subject of the screws, I must request permission to dwell a few moments on their application. One of the principal reasons which has induced the writer of these notes to take up his pen as an author, has been, an ardent desire to prove to the naval profession, that no situation in which a ship can possibly be placed ought to justify despair: hope and exertion should only be relinquished with the breaking up of a ship's frame. From the case before us—the application of the screws—a conclusion may be drawn to assist to prove the soundness of this opinion. It was a power resorted to when those usually employed were exhausted, and the *method* of applying it was original. On the coasts of England, in fact in most parts of the world, screw power is frequently used in launching and transporting vessels, but invariably applied to diminish the weight by lifting vertically; the idea, therefore, of using the screws to push horizontally, reacting

against a foundation of sand, is certainly novel. Could a sufficiency of anchors and cables have been procured, the *Gorgon* would have been hove off, or at the least, the attempt would have been made, according to the long established mode of cables and purchases ; but the point on which it appears that credit is due, is, that when all other means had been used to their utmost extent, and consequently, nautical men, English and foreign, deemed the ship's rescue impossible, new resources were called into play, and new inventions brought forward, by whose agency success ultimately crowned our labours.

The screws and shore purchases being given up, we had so many more men at our disposal, that it was at once determined to give up the use of the engine in future, and apply the capstan power alone to the purchases. The above was not the only reason for this decision ; another was, that the same sudden exertion of power was not now requisite as before, but a more steady, drawing force, such as is exerted by a capstan, would have more effect on the ship, and we should then have the advantages of the decrease of weight, consequent on the absence of water in the boilers, and the danger of carrying away a cable would be materially reduced. These reasons were sufficient to induce Captain Hotham to decide against the further use of the engine ; a capstan was sent from her Majesty's ship *Satellite*, which was fitted over

the engine-room hatches, making then four capstans on board, viz., the *Gorgon's* own upper and main-deck capstans, that taken from the beach, and fixed close forward on the forecastle, and the one from the *Satellite* over the engine room. The purchase falls worked by them were thus: the starboard large purchase, and that on the quarter-cable, to the two first; the port large purchase to the forecastle capstan, and the purchase on the cable of the anchor that came from Rio, to that over the engine room. No time was lost in sending for plank and timber to construct two more camels—one forty-seven feet in length, to be secured under the port quarter, the other forty-one feet, for the starboard quarter; their sections were to be of the same dimensions as that last constructed; their lifting power would, therefore, be equal to seventy-six and sixty-six tons respectively. The lighter hitherto on the starboard quarter was removed, a greater power being more easily applied by a camel. The extraordinary rapidity with which these two camels were built and secured, reflects high credit on the shipwrights and those concerned; within sixty hours after the materials had arrived from the town, they were lashed and shored in their proper positions, without a leak or any defect. Of the extent of work done in that time, some idea may be formed, when it is known, that besides the building of the frames, placing the planks, &c., in the larger of the two, upwards

of two thousand feet of seams had to be most carefully caulked and payed, and the lesser one in proportion.

These two were the last camels that were constructed; indeed, no more could have been applied to the ship's side with advantage. The intervals between them were filled up with casks, the boilers under the port quarter, and the tanks under the starboard bow, remained in their former position.

The extraordinary efficacy of the camels, *must* surely be appreciated by all nautical men; I say extraordinary, because, when in a situation like ours, where unforeseen difficulties and impediments are daily, nay, hourly, brought to light, instruments are found, which, in a high degree, combine great power with simplicity and economy, and in every instance, actually surpassed all expectations; it may surely be permitted to call their effect, extraordinary. But, although their application had been extended to the utmost, and apparently no farther power was required, invention was not yet at rest; should, at the next rise of tide, our hopes and anticipations of success not be realised, another plan substantially founded on the same principle as the camels, was in contemplation. As it afterwards proved, this method was never put in practice, as, greatly to our satisfaction, it was not needed—but its simplicity and economy may recommend it for adoption on some future occasion, by a steamer similarly situated—the idea was this: spread out

a sail of stout canvas; line the seams and other parts which appear much worn, with canvass, then tar the whole well over, inside and out. Lay up eight or ten grommets of eight-inch rope, their circumference being equal to about one-third the breadth of the sail; roll the sail up lengthways so as to form a cylinder as large as the sail will allow when rolled up three times, secure the seam well, and pass the cylinder through the grommets, securing the ends with caps of four parts of canvas of the same diameter as the grommet, in one end an opening is to be left, through which a hose is to be introduced: this cylinder is to be fixed under the camels, by slip-ropes to each grommet rove through bolts in the ship's bottom, the ends passed on deck: on the same side, a water-tight hose is fitted to the waste water-pipe, and the other end introduced into the opening in the end of the canvas cylinder before mentioned. When in its proper position, this is to be filled with air in the following manner: the steam is cut off from the cylinder on the side where the hose is fitted, by introducing an iron plate into the steam pipe at its junction with the valve casing; and the intention then is to use this disconnected cylinder as an air-pump—the arms of the paddles and iron floats are shipped on each side to act as a fly-wheel, which would be required when working with only one engine—the induction valves are taken off, and in the stuffing boxes in the valve

casing, two air-tight valves are fitted, capable of being worked by hand—on putting the other engine in motion, it will be seen that at each stroke of the piston, the air which is admitted alternately above and below the piston, by opening the valves in the stuffing boxes, is forced through the condensers, air-pump, and hot-well, thence through the waste water-pipe into the canvas cylinder, which by this means can be filled to any pressure it will bear; which may be ascertained by a canvas hose being fitted to the other end of the cylinder, and the end being kept above water, the pressure of air observed in that, will represent nearly the pressure in the cylinder. This was the plan intended to be adopted, should farther power be found necessary to be applied.

We had been assured that after October, all hope of any extraordinary rise of tide was at an end: from the commencement of that month, therefore, every indication of a southerly gale was watched with increased anxiety; we considered ourselves in every way prepared, our only daily employment consisted in the continued excavation of the dock and channel, which would admit of no cessation. At any ordinary rise of water, to the ten-feet mark, for instance, the ship was evidently quite alive abaft, the slightest swell setting into the bay was sufficient to cause the immense power of the camels to be immediately perceived, by the motion they communicated to the ship; if either of

them on one side sprung a leak, which occurred once or twice, the ship instantly listed over two or three degrees to that side, and again righted when the camel was repaired and pumped out dry: this brought to light rather a curious circumstance. At one of our previous attempts to move the ship, when no impression could be made on her, beyond giving her a list to port of about  $10^{\circ}$ , the sudden heel had fractured the waste water and injection pipes, thereby showing that the ship must be slightly strained somewhere; but, as these pipes are of cast iron and are rigidly bolted to the ship's side, a very slight jerk would be sufficient to break them; soon afterwards, however, when the ship was brought upright by the camels, the broken parts resumed their original position, and so exactly, that the fracture could not be discovered without very minute inspection, and in that state were easily and efficiently repaired; this showed what a trifling strain was sufficient to break these pipes, and it would appear that in the event of a steamer taking the ground under any circumstances, should she not be so strongly built as the *Gorgon*, these vital parts of the engine would be liable to serious injury—surely a remedy for this might readily be found, by fitting these pipes with a sliding joint, and also, instead of bolting the extremities to the ship's side, less liability to fracture would be incurred, by fitting it with a slide and flange, giving the extremity of the pipe free

motion in every direction, and making the diameter of the hole in the ship's side, something less than that of the pipe. The circumstance of the pipe re-uniting was satisfactory, inasmuch that it showed us that the ship could not now be strained in any way; but the hopes of all on board as to our speedy release from anxiety, though not from labour, having now amounted almost to a certainty, but little notice was taken of trifles, that a few weeks previous would have been the source of great joy.

In the first week of October during a fresh south-east breeze accompanied by a 10 ft. tide, the ship's quarter had been hove out 7 ft. to seaward, by the quarter purchase; this was owing to our excavations having for some days before been principally conducted in the port dock: a comparatively slight force only, was therefore required to drag the ship into the ditch, as it may be termed, that had been dug along the port broadside.

Our long-looked-for release was on the eve of taking place—and yet, the thought struck us, could it be? Reason and reflection told all, that unless some unforeseen and undreamt-of circumstance occurred, the restoration of the *Gorgon* must speedily be the reward granted to our five months' toil and care. Yet, there is an innate feeling existent in human nature, that even when a long-wished-for and hardly-earned prize is almost within our grasp, a something within makes us

continually anticipate a failure in obtaining it; a something indescribable, that no reason can account for, whispers that some unthought-of difficulty will appear at the last moment. So was it with us. To some, indeed, the last five months had appeared a lifetime; and when the mind is entirely occupied with its present employment, the future is shut out, is unthought of, it sees nothing, imagines nothing beyond that immediately before it: no change can be contemplated. Our minds were, in a great measure, in this state; the idea of the ship being ever again afloat we could not comprehend. The result of a few days effectually changed the current of our thoughts.

Before relating the account of our final happy release, let us pause, to remind the reader what power was at the present period applied, after all the changes and alterations that had taken place, and which have been so confusedly recounted in the preceding pages. And, first, as to the lifting power, or that applied to lessen the ship's draught of water. The *amount* of this is easily ascertained; but the actual *effect*, that is to say, the exact reduction, is not so simple in the attainment: the investigation would involve more delicate and abstruse calculation than is consistent with the character of this publication. The form of the ship's bottom, her exact displacement, and other data would also be necessary, before any result,

in the slightest degree approximating the truth, could be obtained. Let us therefore be content with the mere amount of power, which may be tabulated thus:—

Port side.	Tons.	Starboard side.	Tons.	Astern.	Tons.
Camel (1) . .	56	Camel (2) . .	64	Caisson . . .	57
„ (3) . .	63	„ (4) . .	49		
„ (5) . .	76	„ (6) . .	66		
Boilers . . .	10	Tanks . . . .	14		
16 Pipes . . .	8	10 Pipes . . .	5		
	<hr/> 213		<hr/> 198		

SUMMARY.

	Tons.
Port side . . . . .	213
Starboard side . . . . .	198
Astern . . . . .	57
	<hr/>
Total . . .	468

Shewing a total of 468 tons directly applied to reduce the ship's draught; and, from the description of power, every ton is clearly and inevitably available. There is no loss from friction, or bad material: no doubt as to the proper force being exerted, as is the case with animal power; the machines are in themselves helpless; they are forced to put forth their whole strength; and, as long as they are entirely immersed, there can be no relaxation or diminution to their exertions.

The purchases that were applied, are as follows: On the runner of the large cable, number (2), which was brought over the port quarter, was a purchase

of  $8\frac{1}{2}$ -inch hawser, rove through a three and a four-fold block ; the fall brought to the forecastle capstan. On the runner of the starboard cable, number (1), a purchase of  $8\frac{1}{2}$ -inch rope and two treble blocks ; the fall taken to upper-deck capstan. On the cable (a) that on the anchor from Rio, was a purchase of  $6\frac{1}{2}$ -inch rope, and two treble blocks ; the fall taken to the capstan over the engine-room. Lastly, a similar purchase on the quarter cable, number (3) ; the fall taken to main-deck capstan.

On the 13th of October at 2 A.M. a heavy squall from the west-south-west passed over the bay, the water as usual rising suddenly to 10 ft. 6 in. The hands were turned up, the capstans manned without delay, and the purchases hove taut ; but the water receding almost immediately after its rise, the men were sent to their ordinary work. At 7 A.M. the water had fallen to 7 ft., the wind still blowing fresh from the south-west. At 9 A.M. the wind veered two points to the southward, and the water instantly rose with great rapidity, till at 10 A.M. it was nearly up to the 11-feet mark. The capstans were therefore again manned, and a hand stationed on shore to report when the ship commenced moving ; the lively motion of the ship was so encouraging, that the men of their own accord, had fallen in to their stations at the capstans ; and showed even to the most superficial observer, by the expression of their countenances,

the confidence that existed in their minds ; it must have been a truly interesting sight to an unconcerned spectator. When all was ready, and the water was well up to the 11-feet mark, the order was given to "Heave ;" at the instant that the strain was brought fairly on the purchases, the ship commenced moving astern, this was at once loudly reported from the shore, causing the men to redouble their exertions, they actually flew round at the capstans, the ship continuing to move freely, and, indeed, at times appeared almost afloat. The undisguised joy and delight of every body, can be better imagined than described ; as the purchases were hove up "two blocks" they were fleeted with great celerity.

The ship had moved about half her length astern, when the runner block of the port cable carried away ; the runner was unrove, and a large single block lashed on the cable inside the taffrail, an 11-inch hemp cable rove through it, one end secured to the port cathead, the other taken to the forecastle capstan. Again it was, "Heave round of all ;" the ship moving out very fast, the chain quarter cable was taken in at the port hawsehole, and slipped from the quarter ; this was a security against the ship's bow tending in shore.

The ship had been dragged her whole length, when No. (1) camel slipped from its shores, and rising, the surf struck it heavily against the ship's side, by which it was stove ; soon the whole of the

camels followed its bad example ; this was grievous indeed, but the ship was now entering the mud, and continued to move, though more heavily than before. The cables on the two leewardmost anchors were buoyed and slipped, and extra purchases clapped on the two remaining cables.

The water was now falling, and it evidently had become quite a dead heave, notwithstanding which, as long as the men had the slightest particle of strength left, they applied it at the bars. They did indeed work most manfully. At 5 P.M. the water had fallen considerably, and the few men remaining at the bars were completely fagged ; the order was therefore given to "paul the capstan." The purchases were racked and secured, the chain cable on the port bow was boused well taut ; and we then had time to look round.

By the cable that had been hove in over the quarter, we found that the ship had been moved astern about 320 yards from her original position, and she was now sunk four feet in soft mud. The surf had committed great ravages in the dock, the ship being no longer there to protect it ; the sea made a clear breach over the piles, and the draw-back broke down many of them, as well as considerable parts of the banks of sand, although this was no longer of such serious consequence to us, yet it was painful to see that which had cost so much labour and anxiety to complete, destroyed so heedlessly ; nor was the appearance of the camels

less mortifying. Some were floating about in the surf; some washed up on the beach, all more or less shattered; the "caisson" was the only friend that stood firm under all trials, in prosperity and adversity always the same; although apparently the most insecure and exposed, it never caused a doubt or anxiety as to its stability.

The reason of the defection of the camels was very evident. The gripes, by which they were boused close to the ship's side, were made fast below the camels to the swifter; to this, at the stern-post, was also secured the standing parts of the runners on the heaving-off cables, therefore when these carried away, and were unrove, the swifter, of course, slackened; this gave the camels a little play, which was increased rapidly by the swell, and finally, so as to trip up the shores; they were then completely adrift. However, on examination, it appeared that they were not so entirely destroyed as we had at first imagined, four of them might easily be repaired, but the other two were completely unserviceable, in fact, could be used for nothing else but to repair the others. These were soon in a fit state to be re-secured, which was to be effected in the same manner as before. The former swifter was to be taken off, and the ship swiftered with a single part of 18-inch cable, set up with lashing eyes: this might be boused so taut as to prevent any danger of a recurrence of the previous accident. The cais-

son was unashed, and the mud-clearing machine set to work close to the stern-post, ready to give the ship a fresh start as soon as the camels were ready, and the water sufficiently high. The purchases were applied to the same cables, and brought to the same capstans as hitherto.

The object of our labours was now considered to have been effected ; the act of transporting the ship from the sand into the mud had been looked forward to as the end of our care ; the rest was a question merely of time and hard work. The situation of the ship was still not altogether agreeable ; the morning after she had been hove out, there was but three feet water alongside, and that not at a very low tide.

We perceived that when the water was up to what we had termed the 11-feet mark, by our standard, we might expect 7 feet 6 inches at the stern-post ; but it must be borne in mind, that seven feet of water under the ship situated as she then was, that is, being four feet in the mud, has a *much greater* effect on the ship, than if her keel was resting on hard ground, and the same water round her, on account of the greater displacement in the former instance.

With what real pleasure, not unmixed with pride, could Captain Hotham look back on all his plans, his successes, and his failures, may readily be conceived. To think over the difficulties that had been over-

come, the tedious and arduous duties that had been toiled through, owing to the perseverance and energy of the commanding officer, and the power he possessed of diffusing those qualities in a high degree into the minds of those under him, was now truly gratifying. The seamen looked with feelings of satisfaction and pride, on the enormous banks of sand raised up on the beach by their hands, and which seemed intended to remain as monuments, erected to perpetuate the remembrance of their labours, bearing irresistible though silent testimony to the unflinching, unconquerable endurance of the British sailor: and, indeed, they will not be considered unworthy of such a name, when it is known, that in these banks there were collected upwards of nineteen thousand tons of sand, the whole having been excavated exclusively from the dock, by manual labour. Congratulations, hearty and sincere, poured in on Captain Hotham from all his brother officers, and from most of those in command of the foreign squadrons and vessels of war.

But there was still much work to be done, and no delay could be allowed; should a heavy gale of wind, similar to that of the 10th of May, occur, it might drive Her Majesty's Ship broadside on to the sand, and light as she then was, might place her in a position from which no human means could rescue her.

On the forenoon of the 19th October, as the

water alongside had risen to seven feet, the purchases were all hove taut, and as the ship appeared to spring slightly through the mud, thereby slackening the cables after racking the falls, it was repeated two or three times, and by 4 P.M. the ship had moved astern about five feet; at 4h. 30m. P.M. there was 7ft. 8in. water at the gangway; the capstans were manned, and all the purchases hove on together, the ship instantly commencing to move freely. So long, therefore, as the water remained at the same height, not a moment's relaxation was allowed at the capstans, they were steadily hove on during the whole night; at 2 A.M. the water appeared inclined to fall, but still the ship was slowly dragged astern, although the men were by this time in such a state of exhaustion, that many of the weakest of them fell from the bars, and were taken out from under the capstans fast asleep; many others were asleep on the bars, but none showed by a word or look, even a *wish* that their labour might be discontinued; at 3 A.M. the water had fallen below seven feet, the cables were therefore secured, and the hands piped down till daylight, after having exerted their whole strength for ten hours and a half. We supposed the ship to have been hove astern about 70 fathoms—the cable on the Rio anchor was up and down, it was therefore weighed and transported to the starboard bow, where it was catted, fished, and secured; the chain cable on the *Gorgon's*

anchor No. (5) was slipped; that on the *Vestal's* anchor No. (3) was taken to port hawsehole, and boused well taut.

The ship was still embedded four feet in the mud, which was now considerably softer than that nearer to the sand. As we now were assured that she could be dragged astern by main strength, and at little more than an ordinary tide, the intention of re-securing the camels and "caisson" was, of course, abandoned.

Instead of now detailing the course of work pursued, in heaving the ship through the mud night after night, it will be sufficient to mention that from this day to the 28th of the same month, the water commenced rising at 7 P.M. every evening, at which time the capstans were manned, and the ship hove out till the water again fell, which took place usually about 2 A.M.; in two nights the cable No. (2) was up and down: the daytime was occupied in weighing, laying down, and backing the heaving off anchors; the track passed over, and the position of the ship every morning at daylight, is shown in the chart. As the depth of water increased, the purchases were reduced in power to meet the decrease of resistance, the ship, therefore, was moved much more rapidly, and the 50 or 70 fathoms of the first two nights was increased to 120 fathoms on the night of the 28th. On the morning of the 29th, the best bower was laid out bearing S.S.W. 800 fathoms, the small

bower, West 40 fathoms, and the cables taken in at their respective hawseholes, the ship was then in the position marked on the chart for that day. The next morning the best bower cable was hove in, and a little before noon the signal was made "*Gorgon* is moored." The *Curaçoa* immediately fired a gun, and all the ships in the bay, by signal from that ship, manned the rigging and gave three hearty cheers, which our seamen at once returned with equal spirit.

The next day, November 1st, a gale from the south-west caused a higher river than usual, and to our great delight the old ship swung *head to wind!* It was determined to remain in the present berth till the masts were in, and a large portion of the heaviest stores re-embarked from the beach, and then to shift to the usual anchorage in the bay. The operation of embarking the stores was very tedious, as a very slight increase of the surf on that beach was sufficient to prevent any attempt to remove the heavy gear, such as the spare machinery, shot, shell, and more especially the coals, which proved the most wearisome task of all. The lower masts and bowsprit were our first care; they were launched, and towed off to the ship on the evening of the 3rd, and were hoisted in the next morning. The main-boom and hand-mast were used for the sheers as before; the purchases, and method of rigging the sheers, were substantially the same as when the masts were hoisted out. The

rigging was soon over the mast-head ; the paddle-wheels and coal-bunkers brought off, which afforded ample work for the engineers and blacksmiths ; and carpenters, seamen, and all on board set to work with a hearty will, to prepare the ship for sea as speedily as possible. This was soon accomplished ; in a very short space of time the ship was lying with all her stores, provisions, and coals on board, caulked and painted inside and out ; in fact, had resumed her former appearance of a fine steamer of war.

Captain Hotham had received orders to proceed to Rio in the *Gorgon*, as soon as she was in every respect ready. In the early part of January, therefore, she sailed for Rio, and during the passage, which was well calculated to put everything connected with the machinery and the hull to a fair trial, not a bolt, rod, or screw was found deranged or out of its place. On her arrival there, the services of the diver at Cobras yard were obtained, to examine the ship's bottom ; he reported that the greater part of the false keel, and the whole of the fore-foot was gone, and several sheets of copper rubbed off in various places, but no farther injury discernible. On this being reported to the Commodore, and as the services of the ship were especially required at Monte Video, in consequence of the increasing unsettled state of affairs there, the *Gorgon* was ordered to return to her former station in the River Plate.

The subsequent services of this ship, during the active operations attendant on the intervention of France and England for the pacification of the belligerent provinces in the River, are sufficiently well known not to need repetition. The prominent position she occupied, as the senior officer's ship in the Parana expedition, sufficed to prove the state of efficiency in which she then was, and how capable of performing the duties of a steamer of war. It is to be expected that a vessel drawing seventeen feet water, while "feeling her way" several hundred miles up an unsurveyed river of the most intricate navigation, without a pilot, would occasionally strike on some of the sand-banks with which that river abounds. The *Gorgon* certainly did not escape, although she struck but seldom, yet sufficiently to try the strength of any ship that was not perfectly sound: in no instance did she show the slightest symptoms of weakness. Was anything else wanting to complete the triumph of her able and enterprising captain?

Before closing these remarks, it may not, perhaps, be considered altogether presumptuous in one so advantageously placed as the writer was, to enable him to observe the various qualities that tended to accomplish this unexampled work, if he endeavours to recount them one by one, for the more especial notice of the younger and rising members of the service, and to show what advantages may be derived from reflecting upon the combination of qualities and acquirements which

were the means of procuring so much well deserved credit to the successful designer of this noble and signal illustration of the pre-eminence of British perseverance and nautical skill.

The most conspicuous of these qualities was, a clear mind to trace and combine such means and powers, which gave full confidence of success, which may be called *just confidence in his own powers*, combined with a lively *zeal*, practical experience, undaunted patience and perseverance, with the gift of considerable bodily and mental endurance. It is scarcely necessary to remark, that a man possessing these mental and bodily advantages, holds with them, a supreme authority over the minds of those placed under his command, and this authority is not only perceptible in dignity of manner, but is acknowledged in the heart by every subordinate in the ship.

It may be said, that all these qualities are equally necessary in every profession. It is granted they may be equally valuable, but certainly are not so absolutely necessary as to the commander of a ship's company. Though the church, the army, and the courts of law, are certainly all the better for such qualities, yet the *cause* may find support from another, if one fail. But the ship is alone. Her five or six hundred men, of many grades, have only one head. Therefore, by the naval officer, above all others, should these qualities be first discerned, then understood, then studied, and at

last acquired. How to attain them it may, perhaps, be more difficult to show.

First, no man can have *confidence in his own powers*, unless the early period of his service has been devoted to the studies suited to his profession, and these studies should be pursued with a zeal to acquire an entire mastery of the subjects, for the subjects' sake themselves, making them wholly his own; not being satisfied with the exact portion that might secure some inferior present circumstance, but working all out for future occasion. In combination with this, and for the same end, the young officer should energetically seek to improve every opportunity of gaining *practical experience*. By doing so he will find, that he not only increases his nautical knowledge, but his natural abilities will be quickened, his powers of observation rendered more acute, and eventually, that such an increasing fondness for his profession will have grown upon him, that a more pure zeal will exist, than any that could be formed on a less durable foundation. It is in our nature to be partial to any pursuit in which we excel; surely then, if a person's whole life *must* be spent in a certain employment, it is well worth while for that reason alone, even if actuated by no *higher* motive, to endeavour to create this partiality, by directing his studies more especially towards it, instead of, as is too often the case, allowing the knowledge of *that* to come as it may, while his studies, if any, are directed to other subjects.

During the acquirement of the above qualities, the practice of unhesitating, cheerful obedience, will tend materially to produce *patience and perseverance* under difficulties ; for this purpose also, the mind, while yet unmatured, should be inured to the habit of never relinquishing any pursuit in which it is engaged ; let no employment, however trifling, once commenced, be thrown aside for another, perhaps more interesting. This, combined with cool, well-directed forethought, before deciding on any undertaking, will materially assist to establish that firmness of purpose necessary to form a persevering mind.

The gifts of bodily and mental endurance may be supposed not to be attainable by habit ; but a little consideration will, I think, satisfy a reflecting mind, that habits of mental and bodily discipline cultivated by the young man during his early career, will ensure a strength in the one and an energy in the other, which a neglect of those habits invariably tends to weaken. These habits of discipline ennoble the mind, and are the fruitful source of that dignity of carriage and imperceptible authority over the minds of others, which constitute that last quality so essential to a commander.

It was to the combination of such powers, acquirements, and qualities, that the *Gorgon* yielded her obstinate position : and to the possession of them, in greater maturity, and in a higher degree, were Nelson and Collingwood indebted for their renown.

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## APPENDIX.

THE following are the names of the Officers of all grades who were on board Her Majesty's ship *Gorgon*, when she was driven on shore:—

<i>Captain</i> .....	CHARLES HOTHAM.
<i>Lieutenants</i> .....	<div style="display: flex; align-items: center; justify-content: space-between;"> <span style="border-left: 1px solid black; padding-left: 10px; margin-right: 10px;"></span> <div style="display: flex; align-items: center;"> <span style="border-left: 1px solid black; padding-left: 10px; margin-right: 10px;"></span> <span style="font-size: 1.5em;">}</span> <span>AUG. J. WOODLEY.</span> </div> </div>
	<div style="display: flex; align-items: center;"> <span style="border-left: 1px solid black; padding-left: 10px; margin-right: 10px;"></span> <span style="font-size: 1.5em;">}</span> <span>RICH. S. SMITH.</span> </div>
	<div style="display: flex; align-items: center;"> <span style="border-left: 1px solid black; padding-left: 10px; margin-right: 10px;"></span> <span style="font-size: 1.5em;">}</span> <span>ASTLEY C. KEY.</span> </div>
<i>Master</i> .....	HENRY BAKER.
<i>Surgeon</i> .....	PETER NIDDRIE, M.D.
<i>Paymaster and Purser</i> .....	WILLIAM YOUNG.
<i>1st Lieut. Royal Marine</i>	<div style="display: flex; align-items: center;"> <span style="border-left: 1px solid black; padding-left: 10px; margin-right: 10px;"></span> <span style="font-size: 1.5em;">}</span> <span>J. E. W. LAWRENCE.</span> </div>
<i>Artillery</i> .....	
<i>Mates</i> .....	<div style="display: flex; align-items: center;"> <span style="border-left: 1px solid black; padding-left: 10px; margin-right: 10px;"></span> <span style="font-size: 1.5em;">}</span> <span>WILLOUGHBY C. MARSHALL.</span> </div>
	<div style="display: flex; align-items: center;"> <span style="border-left: 1px solid black; padding-left: 10px; margin-right: 10px;"></span> <span style="font-size: 1.5em;">}</span> <span>FRANCIS L. MCCLINTOCK.</span> </div>
<i>Assist.-Surgeon</i> .....	EVAN EVANS.
<i>Midshipmen</i> .....	<div style="display: flex; align-items: center;"> <span style="border-left: 1px solid black; padding-left: 10px; margin-right: 10px;"></span> <span style="font-size: 1.5em;">}</span> <span>EDWARD MADDEN.</span> </div>
	<div style="display: flex; align-items: center;"> <span style="border-left: 1px solid black; padding-left: 10px; margin-right: 10px;"></span> <span style="font-size: 1.5em;">}</span> <span>EDWARD BARKLEY.</span> </div>
<i>Master's Assistant</i> .....	ROBERT D. SPEER.
<i>Clerks</i> .....	<div style="display: flex; align-items: center;"> <span style="border-left: 1px solid black; padding-left: 10px; margin-right: 10px;"></span> <span style="font-size: 1.5em;">}</span> <span>EDWIN J. FORSTER.</span> </div>
	<div style="display: flex; align-items: center;"> <span style="border-left: 1px solid black; padding-left: 10px; margin-right: 10px;"></span> <span style="font-size: 1.5em;">}</span> <span>CHARLES C. ICK.</span> </div>
<i>Gunner</i> .....	THOMAS WESTLAKE.
<i>Boatswain</i> .....	JOHN McDONALD.
<i>Carpenter</i> .....	JOHN HINTON.
<i>1st Engineer</i> .....	WILLIAM DUNKIN.
<i>2nd Engineer</i> .....	<div style="display: flex; align-items: center;"> <span style="border-left: 1px solid black; padding-left: 10px; margin-right: 10px;"></span> <span style="font-size: 1.5em;">}</span> <span>THOMAS W. BAILEY.</span> </div>
	<div style="display: flex; align-items: center;"> <span style="border-left: 1px solid black; padding-left: 10px; margin-right: 10px;"></span> <span style="font-size: 1.5em;">}</span> <span>WILLIAM ANDERSON.</span> </div>
<i>3rd Engineer</i> .....	GEORGE SAUNDERS.



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